plating

JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

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AES SCIENTIFIC
ACHIEVEMENT AWARD

JUNE
1958

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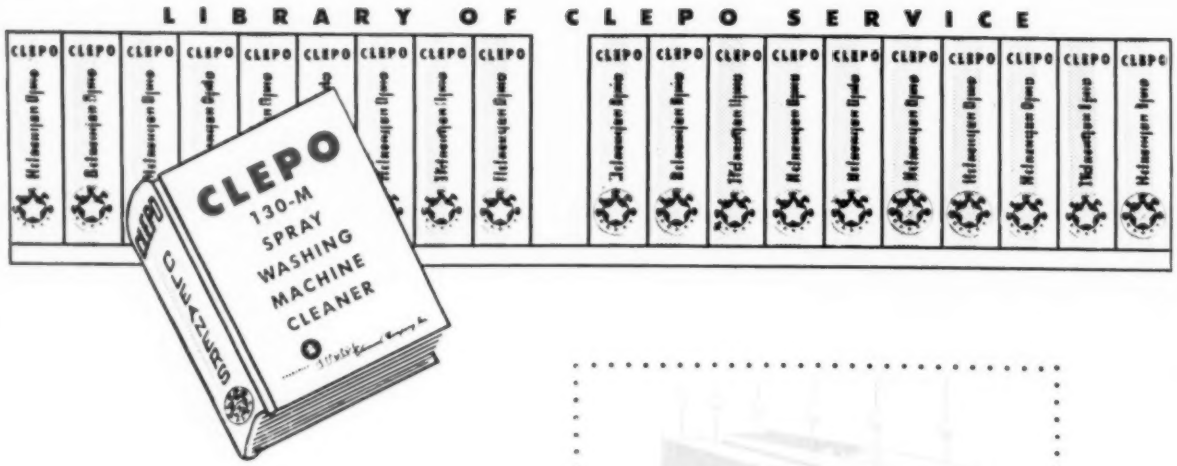

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CLEANER

- it's a heavy duty cleaner, suited to the most difficult steel cleaning jobs . . . YET.
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plating

Journal of the American Electroplaters' Society

June 1958 — **Vol. 45, No. 6**

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Small Crystals—$NiSO_4.6H_2O$ (Size meets screen specification of thru 4 on 35 mesh.)

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EDITORIAL

UNTIL a comparatively brief period ago, our country was riding the crest of boom and prosperity unparalleled in its amazing history. Producers were producing largely, distributors were distributing sizably, consumers were consuming substantially. There was vast supply and vast demand. In this "sellers market," many companies having practically reached saturation in their own fields, diversified—set forth toward new horizons, broader vistas, new worlds to conquer. Research and development assumed new heights in prestige and emphasis.

Transition, relatively, came abruptly—to the rank and file, it came inexplicably. From boom times, our nation became visited with that condition termed in our economic semantics, RECESSION. The "sellers market" became a "buyers market."

When a nation, even a titan in resources, initiative, performance and potential such as ours, operates in RECESSION, usually RETRENCHMENT rides in its wake. And this latter usually means constriction in business spending, in business employment—caution and curtailment throughout the gamut of business operation. And business interdependence being the very warp and woof of our nation's economic structure, the extent of said so-called RECESSION must unavoidably depend upon the stature, projection and duration of such RETRENCHMENT and, conversely, upon the pursuance of courageous, effective merchandising to swell profitable sales volume, heart of any business.

In today's RECESSION and tomorrow's inevitable RECOVERY, the electroplating, metal finishing and allied arts industry must continue its progress so as to continue to well-serve the public interest. Despite RECESSION, it must continue to court self-advancement through technical and scientific research; to equip its component members for survival of the fittest by helping to enrich their scientific and technical knowledge; to fortify its manpower and unite it in a great common purpose by providing it with a means of technical and scientific self-expression and inter-communication.

As the American Electroplaters' Society, in this current economic climate, embarks upon its Fiftieth Anniversary to be observed widely in 1959, its dedication to that goal most surely continues unabated.

A smooth, flawless finish in this mold plated by Nutmeg Chrome Corp. assures an equally flawless finish in molded melamine dishwear. Nutmeg considers the finish of this force and cavity, hard-plated with Mutual Chromic Acid, "about the highest lustre obtainable on any surface."

For perfect plating every time use Mutual *LOW SULFATE* Chromic Acid

When only a perfect finish will do, the purity of Mutual Chromic Acid is one safeguard against plating difficulties . . . and against expensive rejects!

Mutual Chromic Acid is always 99.75% pure – or better. Sulfate content never exceeds 0.1%. Rigid quality control by Mutual insures that the chromic acid you get is always the same. This makes it easy for you to control accurately the acid-sulfate ratio of your plating bath.

To learn more about these and other advantages of Mutual Chromic Acid, send today for "Chromium Chemicals." This booklet gives full technical information on the entire line of Mutual Products. Mutual's Technical Service Staff will also be happy to offer help and information at any time.

Mutual chromium chemicals

Sodium Bichromate
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Allied Chemical

MUTUAL chromium chemicals are available through dealers and **SOLVAY** branch offices located in major centers from coast to coast.

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Dept. 11, 61 Broadway, New York 6, N. Y.

Please send:

- ☐ Bulletin 55—Corrosion Inhibition with Chromates in the Oil and Gas Industries.
- ☐ Bulletin 53—Corrosion Inhibitors in Recirculating Water Systems.
- ☐ Bulletin 35—Corrosion Control in Air Conditioning.

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AS A medium for penetrating the vast purchasing power in the electroplating, metal finishing and allied arts market with YOUR product's merchandising story, PLATING MAGAZINE offers the largest paid circulation in this field by an appreciable margin and by far the smallest unpaid circulation.

That's according to the latest available Publishers' Statements of the Audit Bureau of Circulations (ABC), these covering the six-month period ending December 31, 1957—"latest available" being as this goes to press (April 1, 1958).

Make the cover-to-cover comparison as to appearance, content, effectiveness—compare its ABC Publisher's Statements with others as to range and stature of coverage—compare its advertising rates as to cost. Try PLATING and be sure as to values.

You'll then understand why so many progressive companies have been using PLATING consistently, year-after-year—why so many more are coming aboard[1]—why so many rate so high, the prestige of PLATING advertising.

---

[1]PLATING announces with pride the recent addition or resumption of these advertisers for 1958:

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SPECIFY **plating** to reach this market's vast purchasing power.

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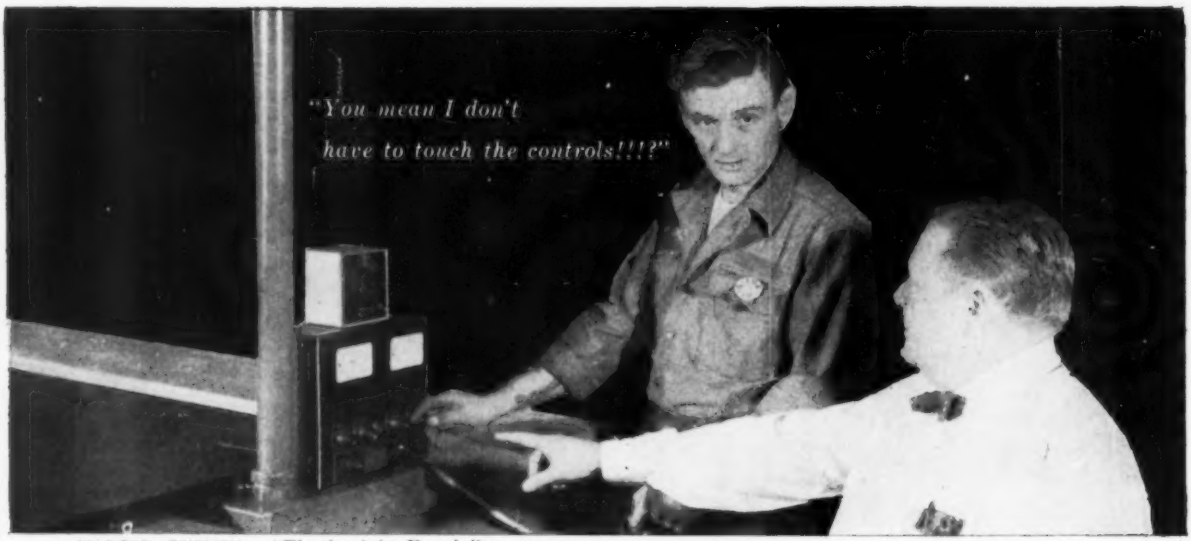


HAROLD GURNEY: "That's right Frank."
"*This* unit is specially designed for anodizing. With this new RAPID rectifier, output current adjusts itself automatically to compensate for load changes."

Plating Foreman: "You mean I set it once and forget it?"

Harold Gurney: "Right again. You see, the unit continuously senses load variations and automatically maintains a constant current density per square foot of work."

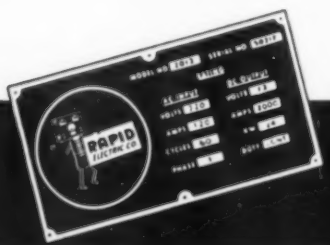
Plating Foreman: "That makes it a lot easier to accurately control a pre-determined film thickness in anodizing."

Harold Gurney: "You're catching on fast. And what's more, Automatic Current Density Control eliminates the possibility of overcurrent and subsequent costly rejects, maintaining Fenn's high quality standards."

Take a tip from Harold Gurney. Find out how ACA can save you both time and money.

Write for Rectifier News Bulletin Vol. 2, No. 1 or ask to have a representative call. No obligation of course.

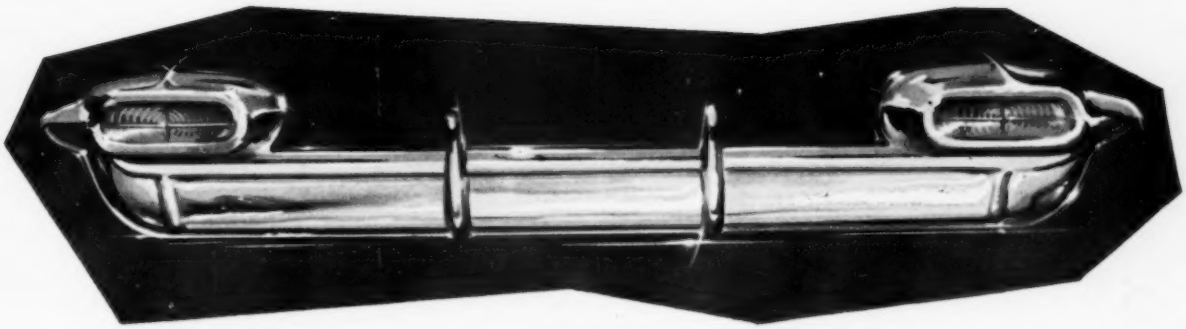
Fenn Manufacturing Company Newington, Connecticut

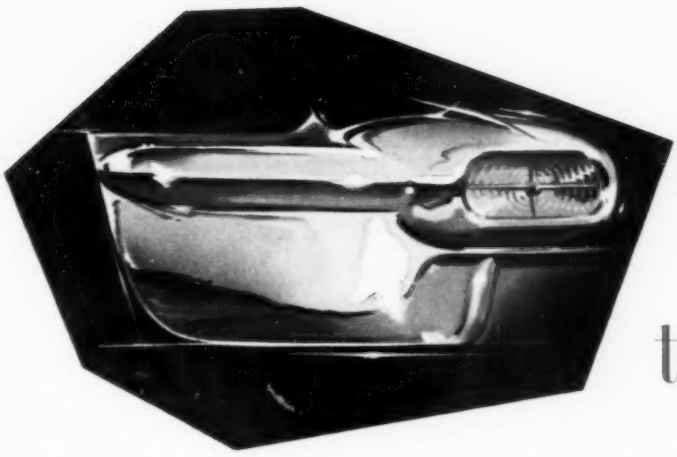


THE NAMEPLATE THAT MEANS *"More Power to You!"*

RAPID ELECTRIC COMPANY

12838 Fenkell Avenue • Detroit 27, Mich. • Diamond 1-8537
2881 Middletown Road • New York 61, N. Y. • TAlmadge 8-2200





Acme designs custom setups to volume-finish difficult shapes

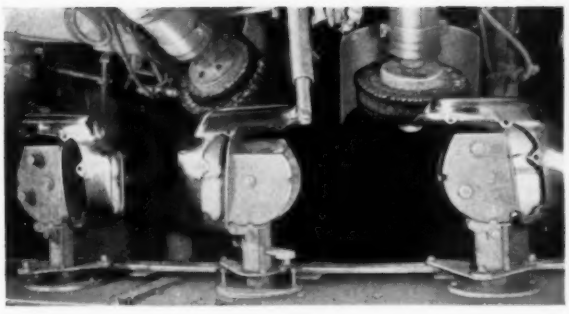


Photo shows three of twenty-one operations on Acme machine for finishing all contours of auto bumper part. At each station, part is automatically positioned and buffed by 20-hp floating-head lathe.

Polishing or buffing difficult contours on a volume basis can only be a successful and economical operation when the equipment is designed for the job—by experts. That's why, for nearly fifty years, manufacturers have turned to Acme-designed equipment.

Skilled Acme engineers receive the problem-product and, with *standard* units and a wide variety of accessories, design a *custom* machine to do the complete job. Each model change brings new challenges, yet much of the Acme equipment can be used year after year.

Next time finishing problems come up, give them to an Acme engineer. He's used to them.

LET ACME *Polish Off*

YOUR FINISHING PROBLEMS

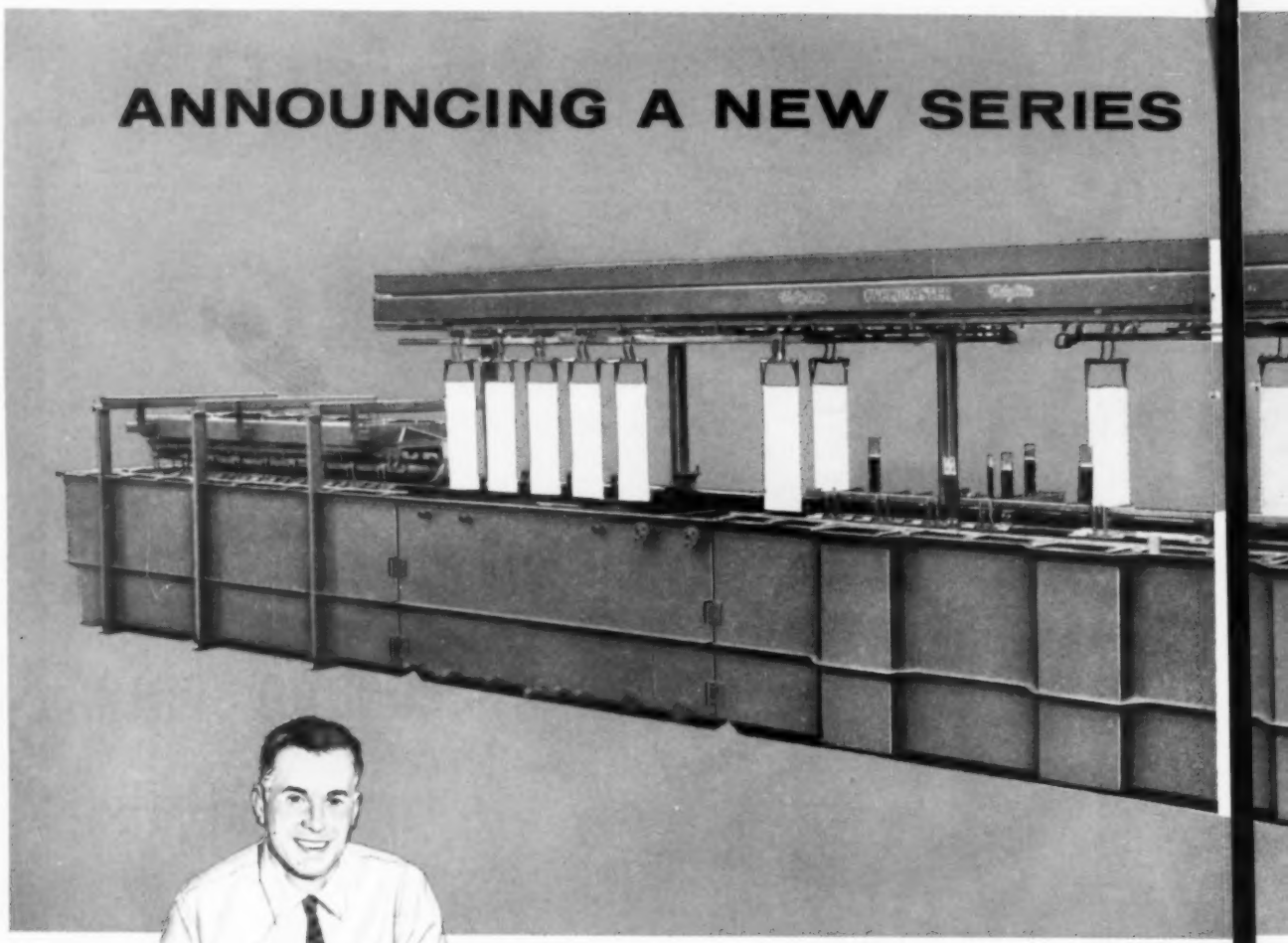
ACME MANUFACTURING COMPANY

1400 E. 9 MILE ROAD, DETROIT 20, MICHIGAN

LEADING PRODUCERS OF AUTOMATIC POLISHING AND BUFFING EQUIPMENT SINCE 1910

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 606.

ANNOUNCING A NEW SERIES



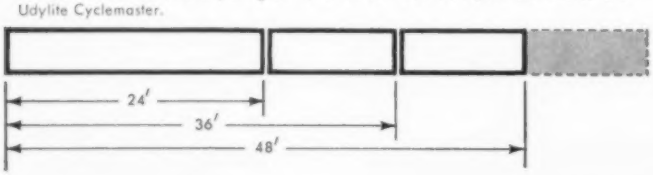
Offering "Custom Built" Quality

For the first time you can now have the quality and economy of automatic plating . . . at a price well under the cost of a custom-built machine. These new Udylite Cyclemasters based on standard 12 foot sections allow you to purchase a custom machine at "off-the-shelf" delivery and price. The new "unitized" design is unique in its easy application to a wide variety of plating cycles and fitting so many operations both large and small.

Here's how the new Udylite Cyclemasters can benefit you:

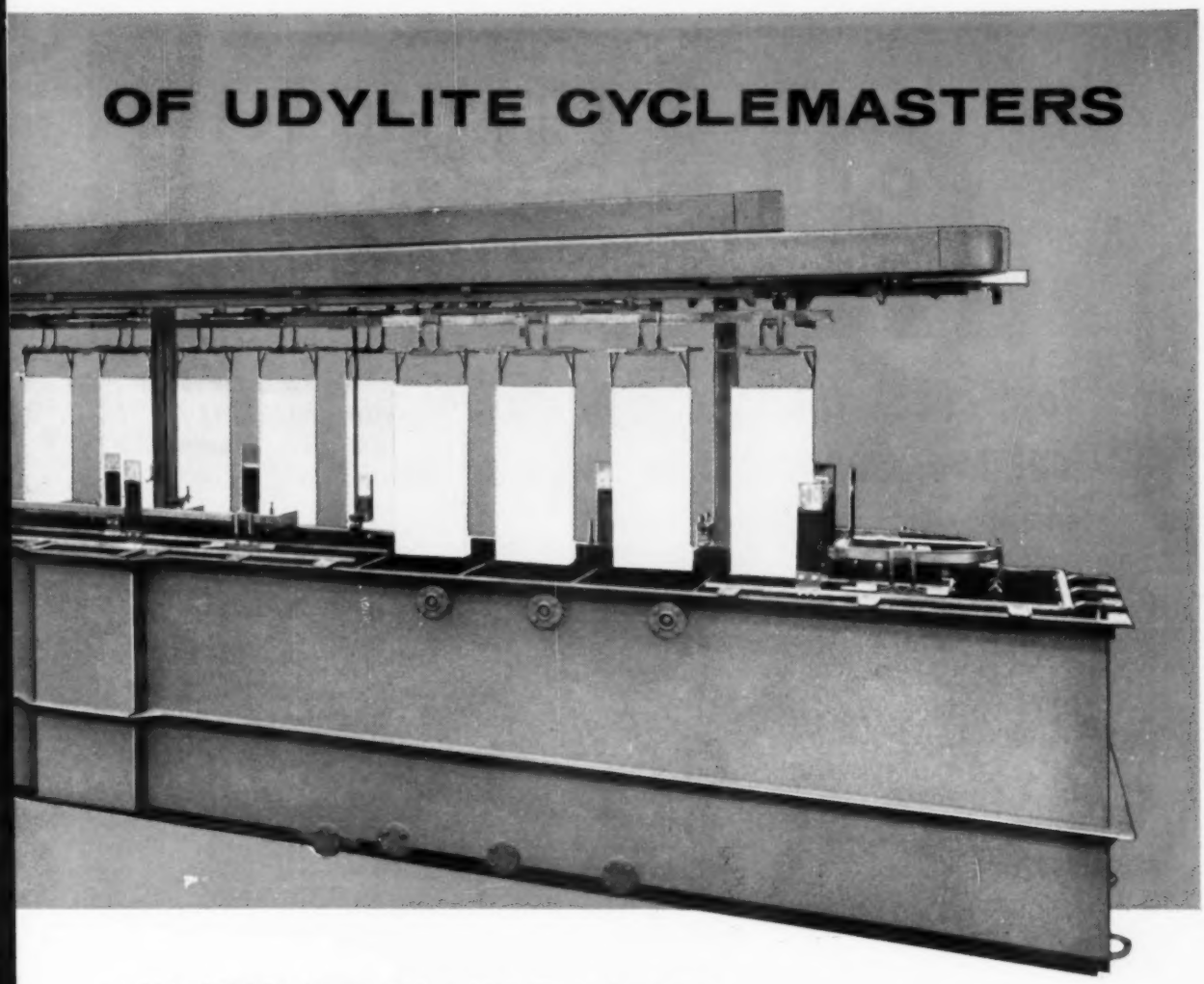
If your automatic plating cycle requires 24 feet or less, you simply purchase a Cyclemaster 24. If you need 36 feet, then it's a Cyclemaster 36 for you; and if you have need of a longer plating unit, you'd purchase a Cyclemaster 48.

The shaded area (below) is the "S" or semi-automatic section. The basic length of this section is 15 feet; and if you need more length, you can get it in increments of 3 feet. For custom built automatic plating at "off-the-shelf" cost . . . your best choice is a Udylite Cyclemaster.



FOR FURTHER INFORMATION, USE READER SERVICE CARD: INDICATE A 607.

OF UDYLITE CYCLEMASTERS



with "Off-the-Shelf" Savings!

But in addition to this time-saving money-saving method of construction, the new Cyclemasters can now include a semi-automatic section. This unit, available as an option, allows extended plating and eliminates the superstructure over tanks where it is not needed. Also, cathode agitation can be easily incorporated.

With the addition of this new series, the Udylite family of automatic plating machines now offers the advantages of full-automatic metal finishing to any production plating operation. Your local Udylite representative can give you full details on how this new member of the "family" of Udylite Full Automatics can increase your plating output and lower your operating costs. Contact him now, or write direct to:

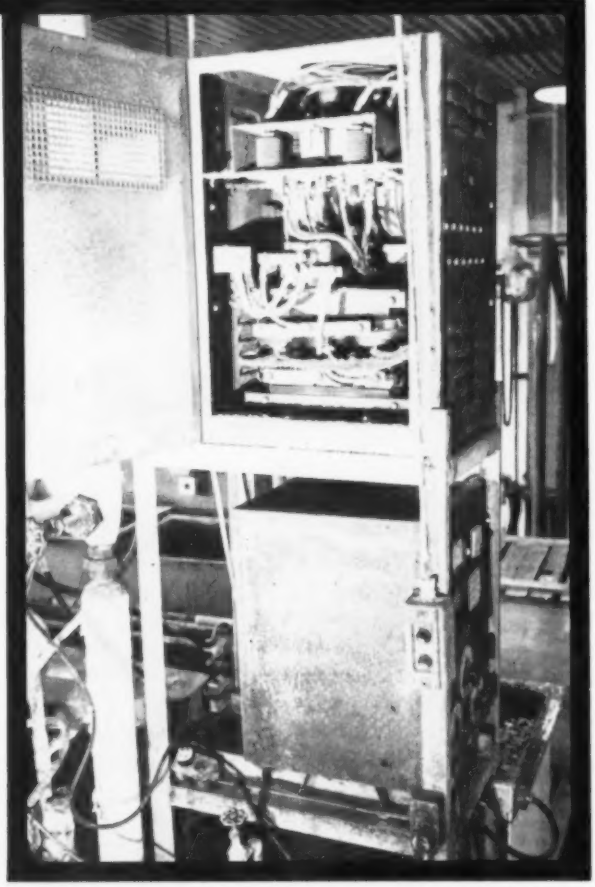
world's largest plating supplier

the udylite corporation

detroit 11, michigan

Richardson-Allen plus SILICON makes the difference

Now, check the results of the longest actual field test ever conducted in the electro-plating field...



Picture courtesy of: Semi-conductor Division, Westinghouse Electric Corp., Youngwood, Pa.

Richardson-Allen pioneered in putting SILICON to work in electro deposition rectifiers. Extensive field tests have proved beyond any doubt that Richardson-Allen electro-plating rectifiers with SILICON are first in performance and dependability.

Check the amazing results on this Richardson-Allen installation...

TIME WORKED —
over two years, aeraging 16 hours a day, six days a week... and still functioning perfectly with...

NO FAILURES DUE TO CELL —
hermetically-sealed SILICON cells do not age, and never wear out.

For complete performance dependability, unequalled life and trouble-free hours of constant work, consult Richardson-Allen for SILICON rectifiers specifically designed for electro deposition. Information on selenium and germanium installations also on request.

RICHARDSON-ALLEN Corporation
Dependable Rectifier Specialists

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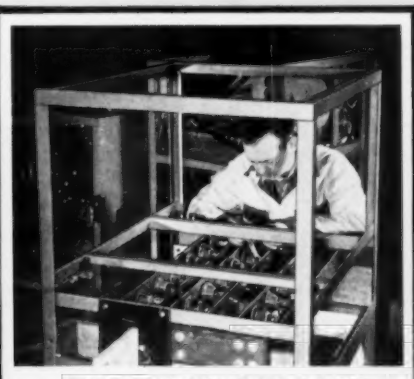
IN CANADA: Richardson-Allen of Canada, Ltd., 1236 Birchmount Rd., Scarborough, Ontario

Products for Progress In Metal Protection

Wagner BROTHERS INC.



A *NEW* "PRODUCT FOR PROGRESS IN METAL PROTECTION"—

The Wagner Brothers Silicon Electroplating Rectifier. Unequalled freedom from maintenance and down-time at approximately the same cost as selenium, less than germanium rectifiers. Twelve high purity silicon cells over 1" in diameter provide great ability to withstand transients of several hundred volts. Outstanding efficiency even in high ambient temperatures to 200°.

Wagner Brothers' finest Product for Progress in Metal Protection is Service. Whether you use Wagner Brothers' anodes, chemicals, rectifiers, automatic plating machines and parts handling equipment — any or all of these — their performance is magnified to a large degree by the periodic or specific attention our sales representatives provide. They not only work right along with you and your plating department, they take your problems back to Wagner Brothers' research staff for the finest analysis and solutions available in the industry. For complete information on the Wagner Brothers line of Products for Progress in Metal Protection — or for immediate assistance — write or call the Wagner man in your area or contact the factory sales offices in Detroit.

MANUFACTURERS AND PROCESSORS OF ALL METAL-FINISHING CHEMICALS, ANODES, AND EQUIPMENT

CHICAGO • CINCINNATI • CLEVELAND • INDIANAPOLIS • LOUISVILLE • NEW YORK • SYRACUSE • GRAND RAPIDS

425 MIDLAND AVE., DETROIT 3, MICHIGAN

Wagner BROTHERS INC.

now

you can get this brilliant finish directly on zinc die castings!

No electroplating--no mechanical finishing!

PART AS CAST

TREATED WITH NEW IRIDITE

NEW

IRIDITE® (Cast-Zinc-Brite)

brightens zinc die castings by chemical polishing, protects against corrosion

NOW, FOR THE FIRST TIME you can get a brilliant, decorative finish directly on zinc die-cast parts . . . without mechanical finishing, without electroplating! The luster is provided by the *chemical polishing* action of new Iridite (Cast-Zinc-Brite) solution. Even surface blemishes, such as cold shuts, are brightened by this new process. No electrolysis. No special equipment. No specially trained personnel. Just a simple chemical dip for a few seconds and the job is done. And, this new Iridite has been *tested and proved* in production.

CORROSION RESISTANCE, TOO! New Iridite (Cast-Zinc-Brite) provides exceptional corrosion resistance for bright-type chromate finishes . . . also guards against blueing or darkening by eliminating zinc plate formerly required in bright chromate finishing of zinc die castings.

AS A BASE FOR ELECTROPLATING—Lower mechanical finishing costs are possible where plated finishes are *required* since the brightness provided by this new Iridite may be sufficient.

LET US SHOW YOU what Iridite (Cast-Zinc-Brite) can do for you. Send us at least a half-dozen typical zinc die-cast parts for FREE PROCESSING for your own tests and evaluation. Or, for immediate information, call in your Iridite Field Engineer. He's listed under "Plating Supplies" in your classified 'phone book. *IMPORTANT: when you give us samples for test processing, please be sure to identify the alloy used.*

Allied Research Products, Inc.

4004-06 EAST MONUMENT STREET
BALTIMORE 5, MARYLAND

***Manufacturers of* IRIDITE®, IRILAC™, ARP® Brighteners and Plating Chemicals—West Coast Licensee: L. H. Butcher Co.**

Save More IMMEDIATE SHIPMENT!

Select from one of the nation's largest stocks of guaranteed rebuilt electroplating motor generator sets and rectifiers with full control equipment.

PLATERS

1—8000/4000 AMPERE, 6/12 VOLT, **CHANDEYSSON,** Synch.
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1—1500/750 AMPERE, 12/24 VOLT, **CHANDEYSSON,** Synchronous.

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1—1000 AMPERE, 30 VOLT, **IDEAL,** Exciter-in-head.
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Oakite Composition No. 90 is a reverse-current cleaner with great ability to remove oils, smuts and other objectionable films that interfere with good electroplating. Solutions have high conductivity and long service life. Controlled foaming eliminates explosion hazards.

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Oakite Composition No. 191 scientifically protects brass from the oxygen that tarnishes during the use of reverse current. Solutions have high conductivity, long life and high tolerance for chromic acid carried over by plating racks.

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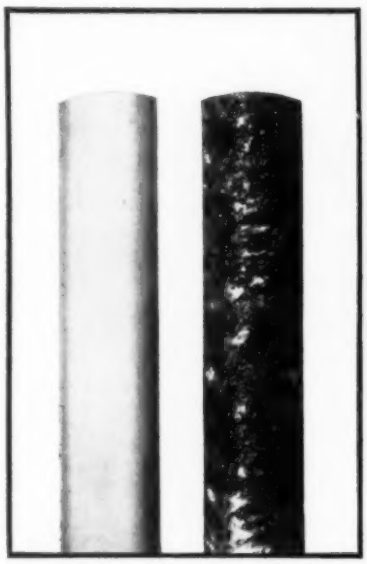

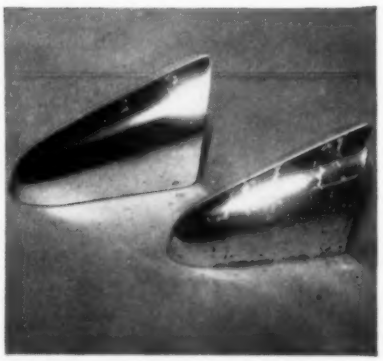

ABOVE. After accelerated acetic acid salt spray 72 hours: Top — Bright Crack-Free Chromium, 75 millionths of inch; Bottom — Ordinary Chromium, 20 millionths of inch; both over .001" nickel and .0005" copper on steel.

LEFT. Steel shaft on right, with 0.0005 inch of ordinary chromium, showed rust over entire surface after 100-hour salt spray test. Shaft at left, with 0.0005 inch of Crack-Free Chromium, was virtually unaffected in same test.

It is well known that ordinary chromium plate suffers from a network of fine cracks . . . an open invitation for corrosives to reach and corrode the basis metal. Now proved too, is the fact that Unichrome Crack-Free Chromium can overcome this shortcoming of ordinary chromium. Deposits stay sound as thickness builds up. The process delivers unimpaired all the inherent corrosion resistance of chromium metal.

FUNCTIONAL, MATTE DEPOSITS

For engineering applications, Industrial Crack-Free Chromium gives a matte finish. It can be used decoratively, too, either "as plated," or after a wheel operation to produce a satin, bright or combination finish. This ductile chromium is solving many corrosion and wear problems on such varied items as hydraulic rams, power steering shafts, washing machine and typewriter parts, high temperature molds, rocket engine parts. In one application, .0009" of Crack-Free Chromium stopped metallic corrosion as well as leakage of aqueous hydraulic fluid, where .003 to .005" of ordinary chromium failed.

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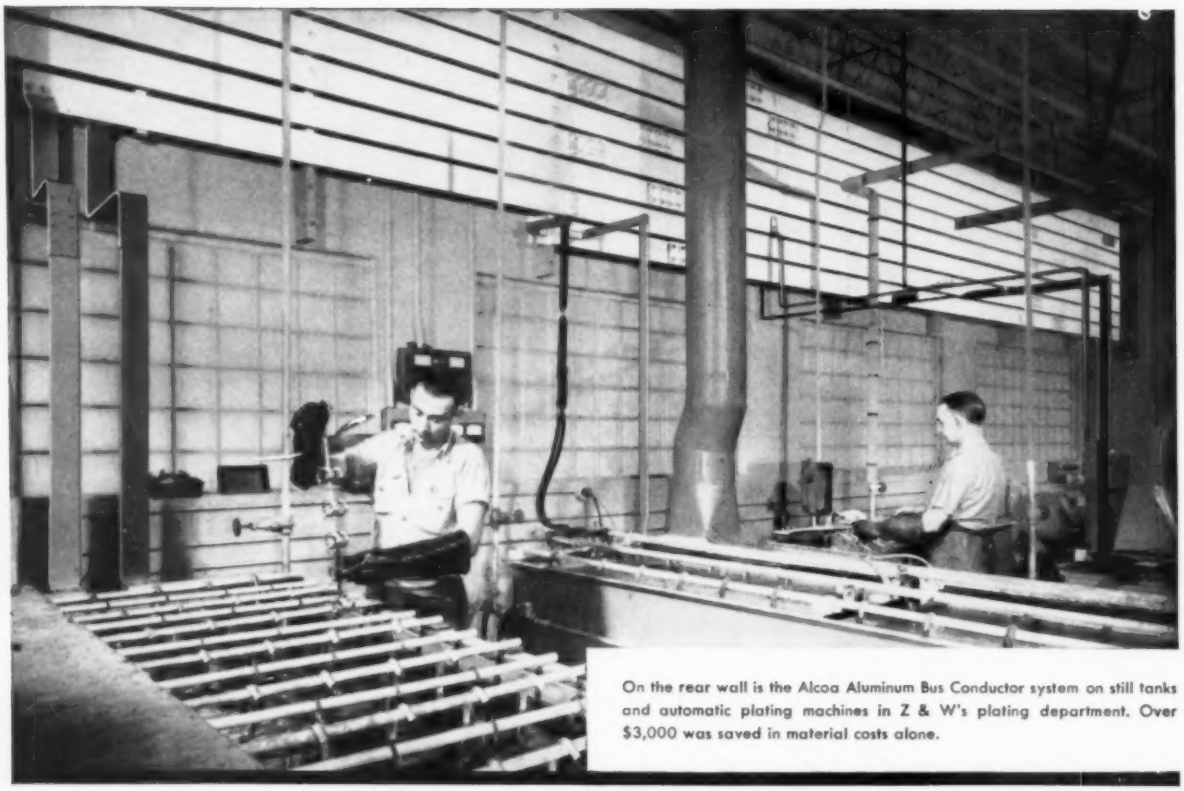

On the rear wall is the Alcoa Aluminum Bus Conductor system on still tanks and automatic plating machines in Z & W's plating department. Over $3,000 was saved in material costs alone.

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The same technical advice and assistance from Alcoa that enabled Z & W to engineer, design, fabricate and install this bus system are yours for the asking. Study how much you could save with Alcoa Bus Conductor—for expansion or modernization. Cost is about half. Alcoa Bus Conductor is available for immediate delivery from your Alcoa distributor. Look under Aluminum in the Yellow Pages of your phone book. Or write, Aluminum Company of America, 2313-F Alcoa Building, Pgh. 19, Pa.

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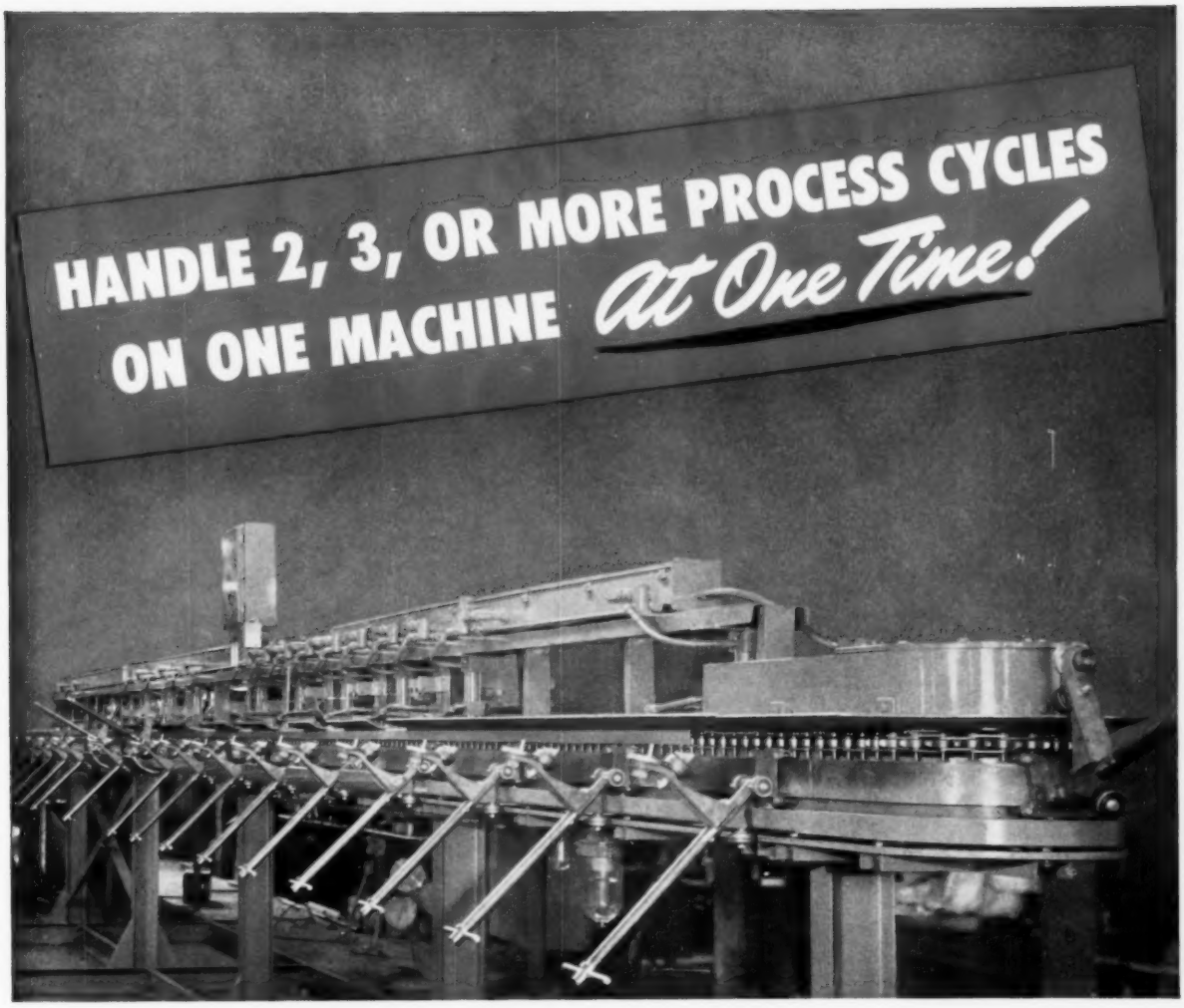

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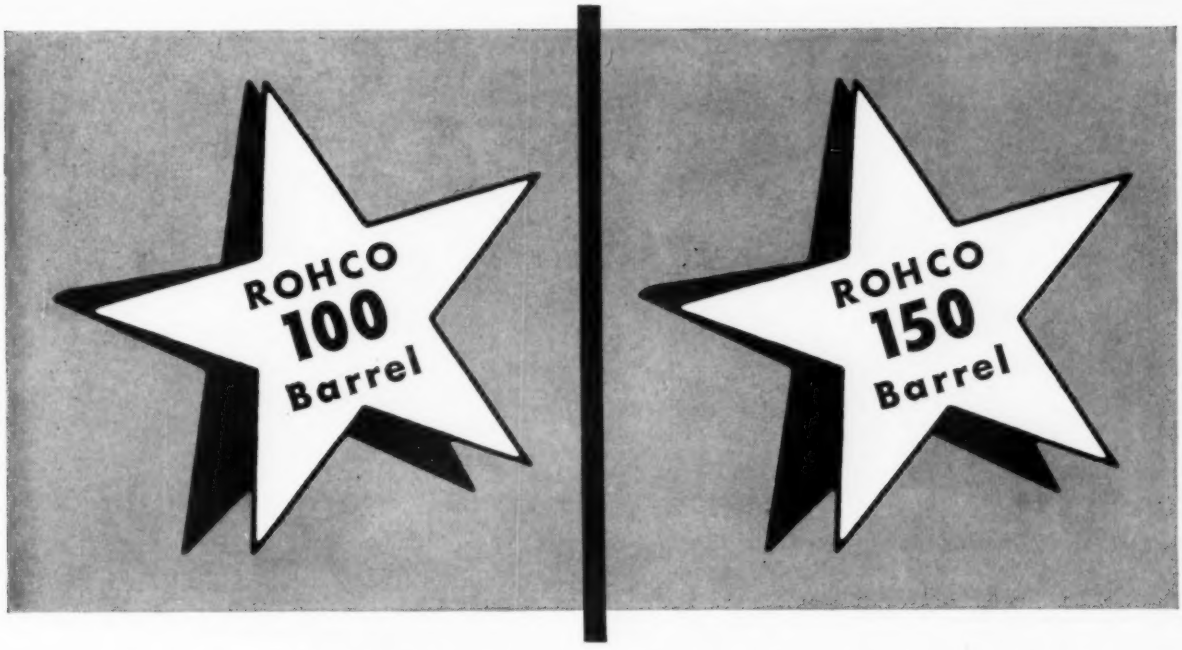

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ASTM ANNUAL MEETING AT BOSTON

The 61st Annual Meeting of the American Society for Testing Materials starting June 22 in Boston will be the largest ever held in the history of this national technical society. In addition to eight technical sessions; eleven symposiums and five luncheons; over 800 committee meetings will be held.

Recognizing the need for authentic information in this technical age, several symposiums will be held dealing directly with basic research and the furtherance of science. Included will be symposiums on Materials Research Frontiers, Basic Mechanics of Fatigue and Radiation Effects on Materials.

Sessions on Ferrous Metals, Fatigue, High Temperature, Crack Propagation and symposiums on Duration of Structures, Bulk Sampling, Solvent Extraction in Analysis of Metals, together with report sessions, will round out a program of 42 technical sessions and symposiums.

In addition to the Annual President's Luncheon, Tuesday, June 24, at which retiring President Richard T. Kropf will speak, four luncheons are scheduled.

Awards, presentation of highlights from the board of directors report by Executive Secretary Robert J. Painter and recognition of 50-year members will be made at the President's Luncheon.

The annual Marburg Lecture established by the Society to honor its first secretary will be presented Wednesday, June 25. Elmer W. Pehrson, chief of the Division of Foreign Activities of the U. S. Bureau of Mines, will discuss "Man and Raw Materials."

The Gillett Memorial Lecture sponsored jointly by ASTM and Battelle Memorial Institute to honor Horace W. Gillett, first director of Battelle, will be presented by Dr. Clyde Williams, former president of Battelle Memorial Institute and now president of Clyde Williams and Co. His subject will be "High-Temperature Metals —Their Role in the Technological Future." The talk will be given Tuesday.

The traditional Wednesday evening banquet will provide relaxation for a week otherwise filled with intensive technical activity. This year the banquet will be held at Concert Hall in Boston and will be followed by the Boston Pops Symphony. The dinner and concert will be sponsored by the New England District Council which has arranged for the entertainment program and also for the ladies' program which will be active throughout the week.

In conjunction with the annual meeting, the 13th exhibit of testing and scientific apparatus and laboratory supplies will be held. Over 60 exhibitors will display innovations in this burgeoning industry.

ZINC INSTITUTE ELECTS AT ANNUAL MEETING

At the April 14 annual meeting of the board of directors of the American Zinc Institute, its entire slate of officers was re-elected to serve for another year—as president, S. D. Strauss, vice president and manager of sales, American Smelting and Refining Co., New York City; as vice presidents, J. D. Bradley, The Bunker Hill Co., San Francisco; Clarence Glass, Anaconda Sales Co., New York City and H. L. Young, American Zinc Sales Co., St. Louis; treasurer, G. H. LeFevre, U. S. Smelting, Refining and Mining Co., New York City; executive vice president and secretary, J. L. Kimberley, New York City.

Directors elected for the term expiring 1961 are H. D. Carus, Matthiessen & Hegeler Zinc Co., LaSalle, Ill.; C. M. Chapin Jr., St. Joseph Lead Co., New York City; R. G. Kenly, The New Jersey Zinc Co., New York City; E. H. Klein, The New Jersey Zinc Co., New York City; J. J. Lennon, American Metal Climax, Inc., New York City; F. S. Mulock, U. S. Smelting Refining and Mining Co., Boston, Mass.; R. F. Orr, Athletic Mining and Smelting Co., Ft. Smith, Ark.; O. A. Rockwell, Eagle-Picher Co., Miami, Okla.; C. N. Waterman, American Smelting, and Refining Co., New York City and H. L. Young, American Zinc, Lead and Smelting Co., St. Louis.

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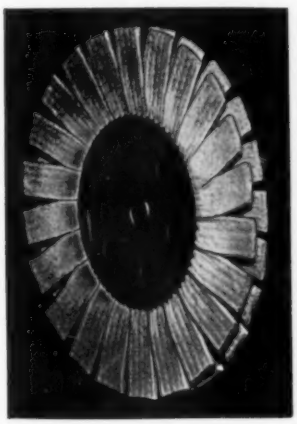

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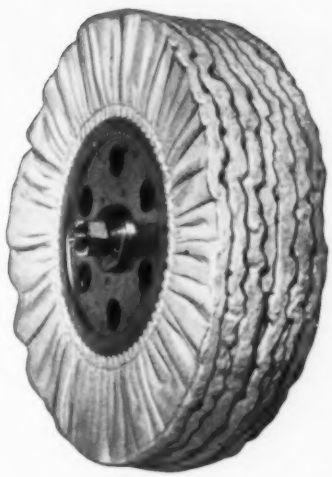

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Photostat or microfilm copies of articles in available magazines may be obtained from: Library of Congress, Washington, D. C.; New York Public Library, New York; Engineering Societies' Library, New York, at prevailing rates. In other cases, consult Wilson's Union List of Serials at your nearest public library for other sources of these articles.

61. ALUMINUM

a. *WAVE FORMS OF ELECTRIC CURRENT IN ANODIC OXIDATION OF ALUMINUM BY OXALIC ACID PROCESS* (*Japanese*).
Toyoji Ushioda, Osamu Yoshimura and Takashi Abe.
Light Metals (Tokyo), *7*, November 1957, pp. 64–67.

62. ANODIZING

a. *BRIGHT ANODIZING BY THE MODIFIED ERFTWERK PROCESS.*
R. Peek and A. W. Brace.
Electroplating and Metal Finishing, *11*, No. 3, March 1958, pp. 71–76.

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a. *AMINO ACID CADMIUM PLATING SOLUTIONS FOR ULTRA STRENGTH STEEL.*
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Electroplating and Metal Finishing, *11*, No. 3, March 1958, pp. 85–87.

64. CHROMIUM

a. *FINISHING POINTERS—CHROMIUM PLATING THICKNESS.*
J. B. Mohler.
Metal Finishing, *56*, No. 4, April 1958, pp. 58 and 67.

b. *COLD CHROMIUM PLATING IN RUSSIA.*
A. J. Steiger.
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65. COATING

a. *FLAME SPRAYING OF METALS.*
D. E. J. Cunningham.
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66. CORROSION

a. *CORROSION INHIBITION BY ORGANIC AMINES.*
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67. ELECTROPOLISHING

a. *CONTOL OF OPTIMAL CONDITION FOR ELECTROLYTIC POLISHING AND SOME NEW DEVELOPMENTS IN BATHS.*
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Metalloberflache, *11*, November 1957, pp. 316–319. (German)
"Some new methods for measuring the impedance modulus. This led to the determination of optimal bath concentrations. New types of baths of melted salts and melted metal hydroxides were developed."

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a. *NITRITE INHIBITION OF CORROSION: SOME PRACTICAL CASES.*
T. P. Hoar.
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69. MANAGEMENT

a. *THAT BIG STEP FROM SUPERVISOR TO EXECUTIVE.*
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a. *A NEW APPROACH TO THE MEASUREMENT OF COATING THICKNESS BY FLUORESCENT X-RAY ABSORPTION.*
Fred A. Achey and Earl J. Serfass.
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Jay Sullivan
2. HOW TO DO CHEMICAL MILLING.
Ken Clark.
American Machinist, *102*, No. 6, March 24, 1958, pp. 122–127.

b. *CHEMICAL MILLING.*
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Product Engineering, *29*, No. 5, February 3, 1958, pp. 50–53.

c. *PLATED STAINLESS STEEL SHEET* (*French*).
Metallurgie et la Construction Mécanique, *89*, November 1957, pp. 935–937.
"Advantages of plated stainless: choice of thicknesses, selection of base metal, amount of plating, as influenced by end use."

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Metalloberflache, *11*, November 1957, pp. 368–370.
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72. NICKEL

a. *EFFECT OF ADDITION AGENTS ON THE PLATING OF NICKEL.*
A. Goswami.
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b. *STRESS-FREE NICKEL PLATING.*
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73. ORGANICS

a. *HEAT TRANSFER THROUGH COATED METAL SURFACES.*
Robert P. Lee.
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Lt. Lloyd A. Horrocks.
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E. S. Beck.
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a. *FACTORS AFFECTING RESIDUAL STRESS IN ELECTRODEPOSITED METALS. A CRITICAL EVALUATION. PART I.*
Joseph B. Kushner.
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b. *WEAR OF METALS.*
F. T. Barwell.
The Journal of the Institute of Metals, *86*, February 1958, pp. 257–269.

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a. *THE A.R.D.E. CHEMICAL SMOOTHING PROCESS FOR STEEL.*
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Lester F. Spencer.
Metal Finishing, *56*, No. 4, April 1958, pp. 62–65.

In PLATING, April 1958, page 378, Item 31a, Tin and Its Uses was erroneously referred to as a publication of the International Tin Study Group. The Tin Research Institute (address below) is the correct source of this periodical.

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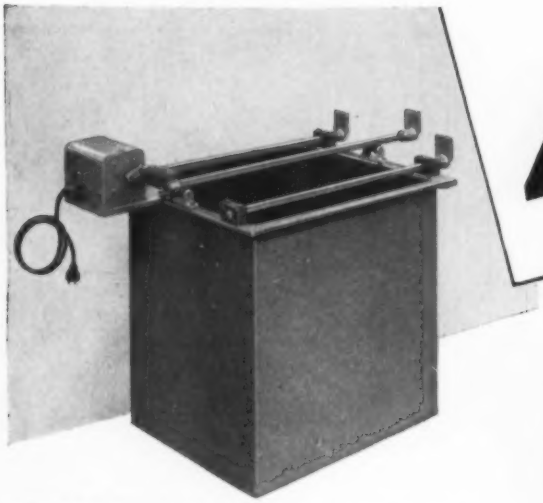

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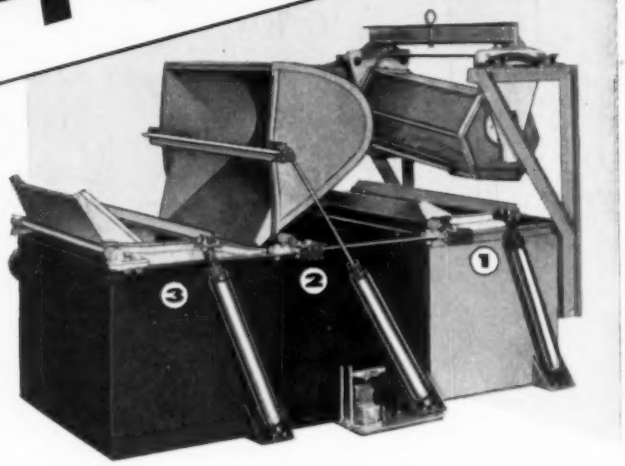

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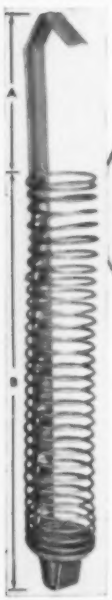

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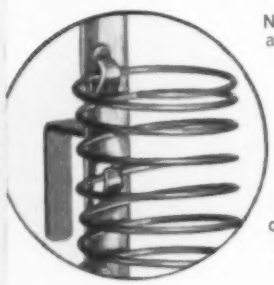

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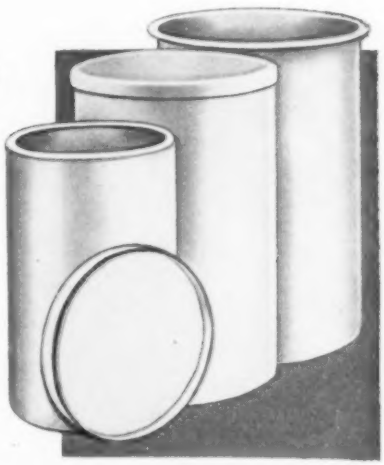

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NEW DEVELOPMENTS IN ANODIZING ALUMINUM

by RICHARD F. HAFER*

I. INTRODUCTION

The major developments in the field of anodizing aluminum which have taken place in the past four or five years have been developments of application rather than principle.

The acceptance of anodizing as a decorative and protective finish in the automotive industry, the increasing use of color anodizing in the architectural field, the development of thick, dense oxide coating having great abrasion resistance, the use of anodizing as a means of electrical insulation, and better quality materials are fundamentally developments of application. They have expanded and will expand the use of aluminum tremendously.

These developments came into being through better understanding and application of the principles and production techniques of anodizing rather than by any major electrochemical discoveries.

II. ANODIZING PRINCIPLES

In order to better understand the developments which have occurred in anodizing in the past few years a short simplified review of the principles of anodizing seems in order.

When aluminum is made the anode in certain electrolytes, oxygen reacts with the aluminum to form a thin, uniform coating of aluminum oxide. The oxide film forms inside out. That is to say, the newest oxide film forms at the metal-film interface. In order for the process to continue, the ions which cause oxide formation must therefore migrate through the oxide film.

Two types of oxide films can be formed on aluminum by anodizing techniques. When the electrolyte does not attack the oxide coating, the oxidizing process can continue only as long as the applied potential is sufficient to drive oxygen ions through the film. This type of coating is continuous and is called a non-porous oxide coating. The best example of this type of anodizing is the boric acid anodic treatment performed on aluminum in the manufacture of electrolytic condensers.

When the electrolyte has a dissolution effect upon the oxide coating, another phenomenon occurs. The oxide coating which is built up, in sulfuric acid electrolytes as an example, consists of two layers, a continuous "barrier layer" at the metal interface, and a porous layer on the outside. The basic principles which exist in forming the non-porous coating apply with the exception that the overall thickness of the porous coating will increase until the rate of dissolution equals the rate of coating formation, and anodizing will continue until the metal supply is exhausted.

The thickness of the barrier layer is dependent upon the type and condition of electrolyte and the applied potential; and the extent of porosity of the porous layer is dependent upon the type of solution used, its temperature, concentration, and the applied potential.

The abrasion resistance, corrosion resistance, and dielectric strength of the non-porous coatings exceed those of the porous coatings per unit of oxide film thickness, however, the porous anodizing treatments offer many advantages and for the following reasons are in greater use:

1) Lower equipment costs
2) Lower operating costs
3) Greater overall film thicknesses
4) Absorption of coloring media

III. PROPERTIES OF ANODIC FILMS ON ALUMINUM

The properties of porous oxide films on aluminum vary with the thickness of the "barrier layer," the overall thickness of the coating and upon the degree and extent of porosity of the porous layer. The type of alloy is also a determining factor with respect to these properties.

In general it is safe to make the following assumptions regarding the properties of porous oxide coatings:

1) The thicker the barrier layer—
   a. the greater corrosion resistance per unit film thickness
   b. the greater abrasion resistance per unit film thickness
   c. the greater dielectric strength per unit film thickness
2) The thicker the porous layer—
   a. the greater overall corrosion resistance
   b. the greater overall abrasion resistance
   c. the greater overall dielectric strength
   d. less flexibility
   e. greater absorption
3) The greater the porosity of the porous layer (pore size and number)—
   a. the lower overall corrosion resistance
   b. the lower overall abrasion resistance
   c. the lower overall dielectric strength
   d. greater absorption
   e. greater flexibility

Since the operating variables of the anodizing solution control the thickness of the film and its porosity, it therefore becomes possible to develop anodic coatings on aluminum which have properties to suit almost any type of environment or condition. Table I illustrates the effect changes in operating conditions of sulfuric acid electrolytes have on the properties of the oxide films.

A. Corrosion Resistance

The corrosion resistance of oxide films developed by anodizing afford considerable protection against weather and neutral solutions. Alkaline solutions attack the oxide film

* Chief Finishing Engineer, Reynolds Metals Company, Louisville, Kentucky.

TABLE I

EFFECT OF OPERATING VARIABLES ON PROPERTIES OF ANODIC FILMS

Change in Operating Conditions of Bath	VARIATION OF THE PROPERTIES OF THE OXIDE FILM OR THE ANODIZING PROCESS			
	Softness* Porosity Elasticity	Adhesive and Absorptive Characteristics	Protective Powers	Solubility Rate Of Metal In Bath
Rise of Temperature of the Bath	Increase	Increase	Pass through a Maximum	Increase
Increase in Acidity of the Solution	Increase	Increase	Pass through a maximum	Increase
Increase of Current Density (For one and the same duration of the Process)**	Decrease	Decrease	Increase	Change Very Little
Decrease of Duration of the Treatment (At one and the same current density)	Decrease	Decrease	Decrease	Decrease
Alternating Current in Place of Direct Current	Increase	Increase	Decrease	Increase

* The decrease of the softness, porosity, and elasticity of the anodic film corresponds, generally, to the increase of its hardness, density, and brittleness.
** It is assumed that with the increase of current density the temperature of the anodized surface remains constant.

TABLE II

SALT SPRAY RESISTANCE OF OXIDE FILMS ON ALUMINUM ALLOY 3003-H18

Anodic Treatment	Anodizing Time	Film Thickness	Initial Breakdown
H_2SO_4	15 min	0.00016 in.	384 hr
H_2SO_4	30 min	0.00037 in.	896 hr
H_2SO_4	45 min	0.00057 in.	1512 hr (No Effect)
CrO_3	15 min.	0.00004 in.	212 hr
CrO_3	30 min	0.00006 in.	368 hr
CrO_3	45 min	0.00009 in.	696 hr

vigorously, while most acid solutions above a *p*H of 4.5 show little or no attack.

Chromic acid anodizing provides greater corrosion resistance to salt atmospheres per unit of film thickness than do oxide coatings developed in sulfuric acid. This is due to a thicker "barrier layer" and due to the presence of chromate ions trapped within the coating. However, since thicker coatings can be developed in sulfuric acid electrolytes, greater corrosion protection is obtained by the sulfuric acid process. The facts are illustrated in Table II.

B. Abrasion Resistance

The abrasion resistance of anodic films is a function of film thickness and density. Consequently, a non-porous type of coating will have a greater specific abrasion resistance; but since the overall coating thickness of non-porous coatings is less than that of porous coatings, the total abrasion re-

TABLE III

ABRASION RESISTANCE OF OXIDE FILMS ON ALUMINUM TABER ABRASER

LOAD–1000g RPM–70 WHEEL–CS 17F

PANELS UNSEALED

Alloy	Anodizing Time	Sulfuric Acid		Chromic Acid	
		Film Thickness	Number Revolutions	Film Thickness	Number Revolutions
3003	20 min	0.00024 in.	855	0.00004 in.	57
3003	40 min	0.00051 in.	2480	0.00008 in.	143
3003	60 min	0.00081 in.	4748	0.00014 in.	278
2024	20 min	0.00021 in.	688	0.00004 in.	39
2024	40 min	0.00046 in.	1745	0.00008 in.	114
2024	60 min	0.00073 in.	3460	0.00012 in.	176

sistance of prous coatings is greater. For most normal types of abrasion (handling, fluid flow at moderate velocities, etc.) the standard type of sulfuric acid anodizing is generally satisfactory. Table III compares the abrasion resistance of standard sulfuric and chromic acid anodizing techniques.

While the abrasion resistance of coatings produced under standard anodizing practices is good, the coatings formed by "hard" anodizing techniques such as Alumilite 225 and 226, Martin Hard Coat, and the Sanford Process are exceptional in abrasion resistance.

This development also came about because of better understanding of the principles of anodizing, rather than as a result of a new discovery. Table I shows that the modification of techniques used in hard coating—low temperature, high current density, low solution concentration, addition of agents to reduce dissolution of the oxide coatings—are those which produce harder coatings in standard anodizing solutions.

Hard coatings (Fig. 1) are extremely beneficial, resisting erosion by high velocity liquids and gases, greatly increasing resistance to frictional types of abrasion, but are not satisfactory where friction is combined with impact or heavy loading.

The hardness of these coatings is from 7 to 9 on the Mohs scale. Taber abrasion tests indicate that little wear will occur on non-copper and silicon bearing alloys having a coating thickness of 0.002 in. in 100,000 cycles (C-17S Wheel-1000 g).

The corrosion resistance of hard coated aluminum is extremely good. Test samples have been exposed up to 13,000 hours in standard salt spray testing equipment without noticeable corrosion.

Hard coatings have been used on pump impellers, valve stems and bodies, bearing races, gears, cams, all types of cylinders and pistons, also on aircraft, rocket and guided missile parts. Without hard coating the normally low abrasion resistance of aluminum would make it unsuitable for many of the above applications.

C. Dielectric Strength

The dielectric strength of aluminum oxide coatings was a property often described but little used except as a method of determining the film thickness of the coating. About four years ago, Reynolds Metals Company pioneered a revolutionary method of electrical coil design which made use of the dielectric and insulating properties of anodic films on aluminum. The fundamental concept of this development was the use of strip rather than wire for electrical windings. An example of this type of winding is illustrated by the sheet-wound transformer in Fig. 2. Some of the advantages of strip conductor are as follows:

1. More efficient use of space
2. Maximum insulation required is single turn voltage
3. More rapid winding
4. Stability of insulation in high levels of radiation
5. Good high temperature operation.

The basic requirements of the anodic coatings were flexibility, abrasion resistance, and dielectric strength plus uniform coverage particularly on the edge. It was discovered that for strip, flexibility of the oxide coating was not as important as with wire since the outer stresses set up in winding strip are much lower than wire.

The problem of edge insulation was solved by mechanical edge conditioning, chemical treatment prior to anodizing, and by proper current distribution. Fig. 3 depicts the uniformity of oxide coatings developed on the edge of the strip after

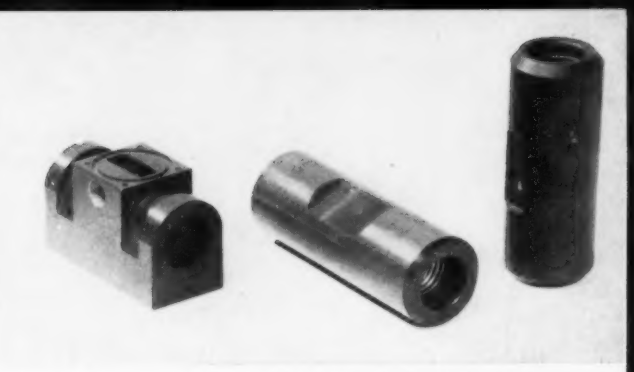

Fig. 1 The three parts shown have been "hard anodized." This extremely abrasion resistant treatment has been successfully used for helicopter control cylinders (on right), pump bodies, pump impellers and, experimentally, for oil pumping sucker rod couplings, shown on the left.

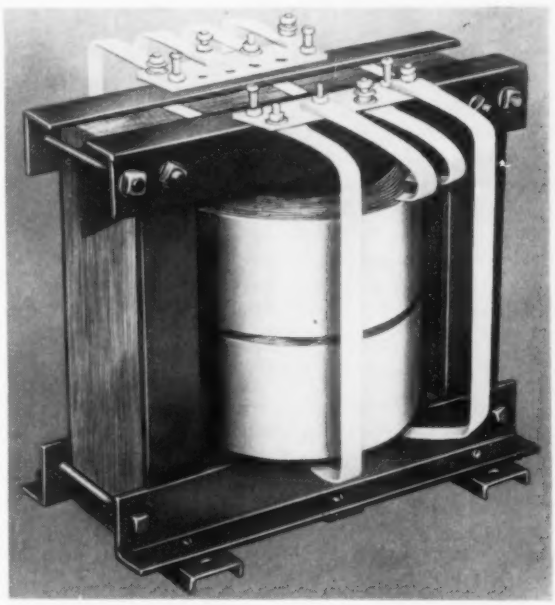

Fig. 2 This dry type transformer was wound from pre-anodized aluminum strip. The anodic coating serves as the electrical insulation.

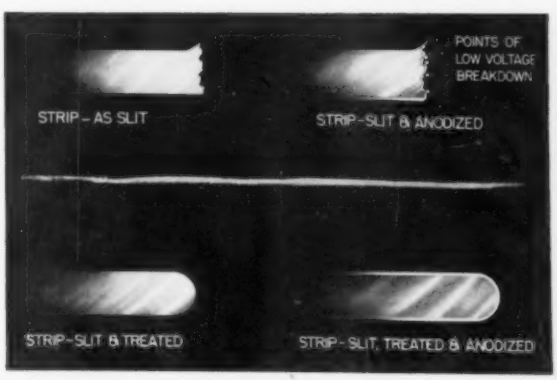

Fig. 3 This illustration shows why proper edge treatment and slitting is important on anodized aluminum conductor strip. Sharp points and corners are logical areas of poor insulation by the oxide coating.

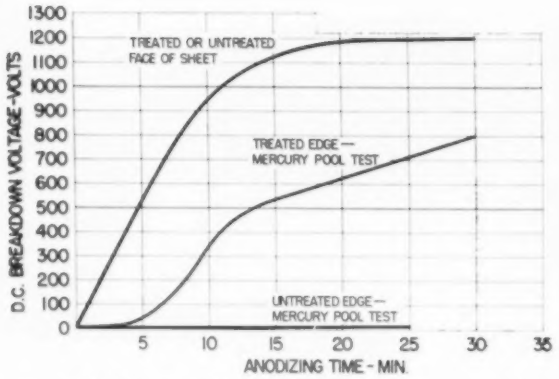

Fig. 4 This figure graphically illustrates the difference in the insulation effect gained by proper edge conditioning of aluminum conductor strip. The test carried out with the strip submerged in a mercury pool picks up the point of lowest electrical insulation.

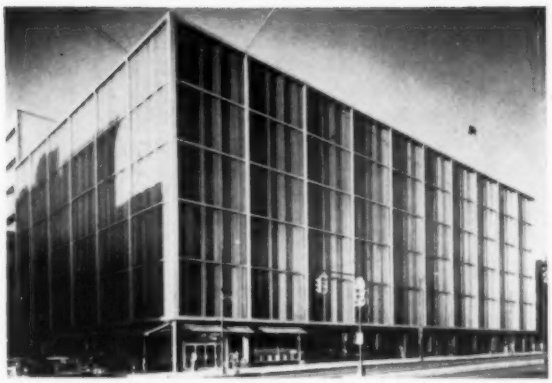

Fig. 5 One of the principal reasons that aluminum has gained such great acceptance in the architectural field is the large number of attractive colors and textures which can be obtained by anodizing. The Thalheimer Building in Richmond, Virginia, is an excellent example of contrasting "grey" and "natural" anodized aluminum.

proper edge conditioning, and Fig. 4 numerically illustrates the increase in the insulating effect of the film developed after proper edge conditioning.

The dielectric strength of oxide films on aluminum vary almost linearly with film thickness and are affected by alloy. Alloys containing non-anodizing constituents such as copper and silicon produce oxide coatings of lower dielectric strength. This is shown by data in Table IV.

IV. THE EFFECT OF ALLOY ON COLOR AND PROPERTIES OF ANODIC FILMS

For most applications and uses aluminum is alloyed with copper, silicon, manganese, magnesium, zinc, or combinations of these metals, to improve its physical properties. The addition of these metals has a pronounced effect on the properties, color, and transparency of anodic films which are developed on their alloys. This can be explained by the fact that metallurgical constituents which made up an aluminum alloy may be:

1. Not attacked (Si, $AlMn$, $CuAl_7$)
2. Selectively dissolved ($CuAl_2$, $MgZn_2$, $NiAl_3$, Fe)
3. Selectively anodized (Mg, AlMg, Mg_2Si)

Therefore, the matrix of the anodic film on commercial alloys may contain any or all of the above modifications. The result is a coating containing residuals, voids, or oxidation products of alloying elements. Consequently, coatings which contain non-anodizing constituents generally exhibit lower corrosion and abrasion resistance and dielectric strength. They cause what in effect is an overall reduction in the thickness of the coating.

To compensate for the "effective" reduction in film thickness, oxide coatings on alloys containing non-anodizing constituents must be thicker than on alloys of better anodizing quality to exhibit equal coating properties.

Alloying elements also affect the color and transparency of the oxide coatings. High purity aluminum produces the most transparent coatings. Aluminum alloys containing silicon develop grey coatings while those containing chromium and manganese develop gold and yellow oxide films respectively.

Homogenous dispersion of alloying constituents and uniform grain size and orientation are required to develop oxide coatings of uniform color and transparency. If an alloy is not homogenous, a phenomenon known as structural streaking occurs when aluminum is anodized.

One of the most important advancements in the anodizing field was the development of alloys and fabrication practices which eliminate the "structural streaking" phenomenon. The

TABLE IV

DIELECTRIC STRENGTH OF OXIDE FILMS ON ALUMINUM
PECHEL HIPOT. METER "H"

LEAKAGE CURRENT—5 MICRO AMP

Alloy	Anodizing Time	Sulfuric Acid		Chromic Acid	
		Film Thickness	Voltage AC	Film Thickness	Voltage AC
3003	15 min	0.00020 in.	245	0.00004 in.	60
3003	30 min	0.00039 in.	420	0.00007 in.	115
3003	45 min	0.00058 in.	610	0.00011 in.	170
2024	15 min	0.00019 in.	150	0.00003 in.	55
2024	30 min	0.00037 in.	295	0.00006 in.	110
2024	45 min	0.00059 in.	460	0.00009 in.	155

Fig. 6 The uses for aluminum in American automobiles are increasing rapidly. Relatively inexpensive, yet highly protective and decorative anodic treatments, are used on grilles, head lamp doors, head lamp bezels, side trim and other decorative applications.

new alloys* are clad products. Pre-rolling and thermal treatment of the cladding reduces the possibility of structural streaking. Another important advantage of this type of product is that "additional mileage" of sheet having the same chemical composition is obtained. This reduces the number of variables in attempting to match color from one part to the next.

V. APPLICATIONS

The acceptance of aluminum in the architectural and automotive industries has been stimulated largely by the multitude of colorful, decorative and durable finishes which can be applied to it. Anodizing with its wide variety of metallic colors has become the major finishing technique in both of these industries. This has been due to the development of color media and techniques which have greatly improved the light and weather stability of color anodized aluminum.

Sulfuric acid anodizing develops oxide coatings having maximum film transparency, good absorption characteristics, optimum corrosion and abrasion resistance; and therefore, to date, has been used almost exclusively in the architectural and automotive industries.

The porous layer of the oxide film found in sulfuric acid is capable of absorbing many types of organic and inorganic coloring media.

The light stability of color anodized aluminum is dependent upon the following:

1. The light stability of the coloring media used
2. The concentration of the coloring media used
3. The size and extent of the porosity of the coating
4. The depth of penetration of the coloring media into the pores in the oxide coating
5. Effective sealing of the coating porosity after coloring.

There are approximately ten basic coloring techniques available. Only five are used to any great extent here in the United States. The processes which involve chemical reactions within the pores of the coating are not widely used here, because of the difficulties encountered in color control. The potassium permanganate-cobalt acetate process, by which colors range from a light gold, through bronze, to black can be developed, is an example of this technique.

Inorganic coloring media generally had better light stability than do organic coloring media. However, with the exception of the chemical reaction processes mentioned above, ferric ammonium oxalate is the only suitable inorganic coloring medium used today which produces an attractive color.

The basic colors currently available today are gold, two shades of blue, black, and yellow. With the exception of the gold, all coloring media are organic dyestuffs. Noticeable changes in the depth of color or hue can be made by modification of anodizing techniques, dye concentration and dyeing techniques, by the use of alloys which develop colored or opaque oxide films directly on anodizing, and by various preliminary surface treatments. Variations in color produced by modifications in dyeing techniques are somewhat dangerous, because the best light stability is obtained from high color content in oxide coating and from maximum penetration of the film porosity.

Considerable use has been made of alloys which develop a colored coating. A silicon bearing aluminum alloy develops a grey colored film. The depth of color depends upon the alloy composition, and the film thickness. The use of this alloy greatly extends the range of available colors. The natural appearance of this alloy is slate grey. When dyed with gold, bronzes and browns are obtained. Blues become blue-greys and yellow becomes avocado.

The color stability required for indoor applications is, of course, not as great as that required for exterior applications. For interior applications the color range is almost unlimited.

The requirements for automotive applications are lower than those for architectural applications due to the nature and life expectancy of the product.

The result of all these developments has been outstanding. Every 1958 automobile made uses aluminum trim, anodized either clear or in color. The building industry in 1956 used approximately 20 per cent of the total aluminum output.

The future looks even brighter and more colorful, and anodizing is bound to have an even more dramatic role.

* Designated RF-40 and RF-50 by Reynolds Metals Co.

Richard F. Hafer was born in Cincinnati, Ohio, June 17, 1924. He entered U.S. Army in March 1943 and served in the Field Artillery. He graduated as a metallurgical engineer from the University of Cincinnati in 1951. Mr. Hafer worked for one year at Electric-Autolite Corp., two years at American Steel Foundries, two years at Stolle Corp., as cooperative student while attending college. He started with Reynolds Metals Company in July 1951 as finishing engineer and became chief finishing engineer in 1955. He is a member of AES, ASM, ASTM, NACE, Porcelain Enamel Institute, Armed Forces Chemical Assn., and the Building Research Institute. Mr. Hafer is a registered professional engineer in Ohio and Kentucky.

MOLD POLISHING

by ARTHUR W. LOGOZZO*

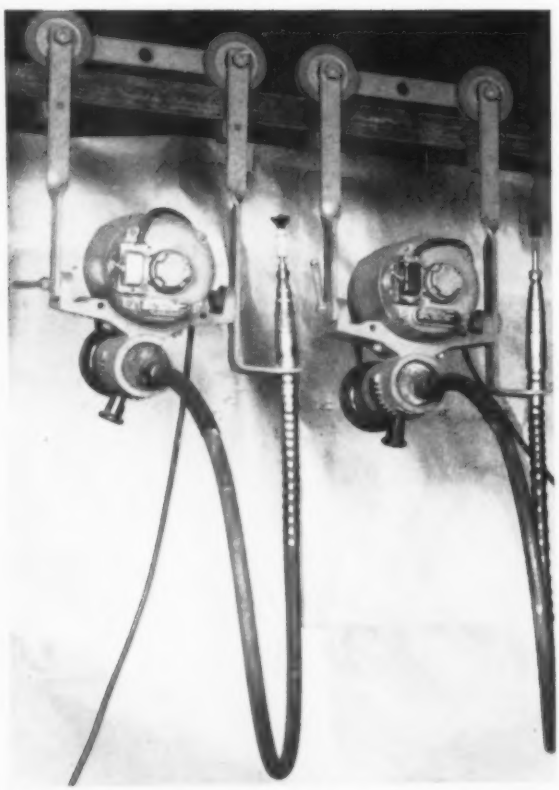

Fig. 1. Closeup of overhead type flexible shaft machines used in mold polishing.

Fig. 2. A small die being polished with a felt bob.

INTRODUCTION

A MOLD CANNOT BE CONSIDERED COMPLETED until the specified finish has been applied. This is a statement of fact recognizable by any qualified mold maker, yet this finishing operation inadvertently will receive less study and attention than any other of the sequences involved in this field.

This apparent apathy results in costly delays at the tail-end of an expensive tool program and frequently results in taking the profit out of the mold making venture. This paper presents practical ideas based on many years of studying and working with this particular shortcoming.

PLANNING

The planning of the final finish on a mold should start as the job is being laid out. When the operators of a mold making shop or department acquaint their personnel with the final polish necessary, immediate discussion on each prior operation and its effect should be considered. Hogging effects should be minimized to prevent tearing of surfaces which frequently results in those tears and fissures that can be bothersome. All cutter work should be finalized with sharpened tools. All grinding operations, particularly surface grinding, should be performed to eliminate checks, and the grinding wheels used should be fine enough to guarantee approximately eight micro finishes. Final bench work prior to hardening should be thorough with a good, smooth surface free of tool marks—the order of the day. This can be time consuming if permitted to wait until after hardening.

All hobbings can be ready with a minimum amount of polishing by putting extra emphasis on the hob finish. Care must be exercised in normalizing or any other handling. In short, hobbing techniques should be developed around the reproduction of good finishes.

HARDENING

Inasmuch as hardening can make or break the polishing

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operation, much attention should be given to the techniques involved whether in one's own shop or elsewhere. It has always seems ridiculous that after so much time and effort has gone into the construction of a mold, that a commercial heat-treater is permitted to handle it along with a batch of other inexpensive, non-critical parts.

In all cases specifications should be spelled out carefully to avoid "burned" effects, orange peel and a myriad of other surface ills due to improper handling by the hardener. When pack-hardening, studies should be made of charcoal which can reduce hours of stoning time by producing the proper surfaces. Controlled atmosphere furnaces can produce ready to finish polish-hardened skins when properly handled.

SCALE REMOVAL

Much valuable time is wasted on the polishing bench by attempting to remove scale from the hardening operation. These scales can vary from fairly light to very heavy deposits of ferric oxide. The more complicated the part, the more time is consumed removing this film before actual polishing on the steel surface can begin.

In studying scale removal some of the early methods involved reverse cleaning in alkaline baths to remove carbon smut deposits from the oil-quenching medium followed by inhibited acid pickling to remove the iron oxide. Since this early method we have progressed to vaporblasting the scale off, to descaling in a periodic-reverse alkaline system, and to the ultrasonic pickling method.

Following is a listing of the descaling methods:

1. Alkaline solution 1 lb/gal
   reverse current 50 to 100 amp/sq ft
   temperature 180 to 210F
   time 5 min
   Follow this with water rinse
   HCl 40 per cent by volume
   room temperature
   inhibitor or wetting agent
   time 10 min
   Water rinse and pumice scrub with tampico brush.
2. Descale in highly sequestered proprietary alkaline solution utilizing periodic-reverse current.
3. Descale by vaporblast method.
4. Descale by immersion in ultrasonic pickling solution.

These methods minimize hydrogen embrittlement of the mold and are highly effective in removing scale. In the absence of any of the above methods, the scale can always be polished off by hand but once again the hours start to mount.

Many jobs can be satisfactorily run with a vaporblast surface. If so, the vaporblast operator should be trained to recognize a scale free surface if the part is to be chrome plated. A uniform, shadowless appearance should be the goal as it is the ultimate in vaporblasting.

A good assortment of polishing materials will include polishing stones from no. 100 grit to no. 800 grit size with all sizes and shapes to handle any contour, all types of sticks, felt bobs, bristle brushes, hard sewed buffs, soft muslin buffs,

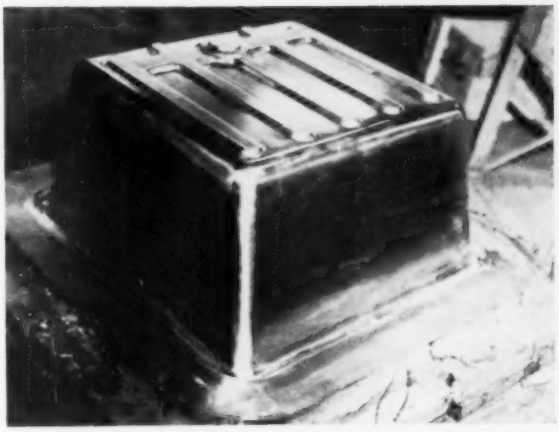

Fig. 3. A vapor-blast finish on a large casting.

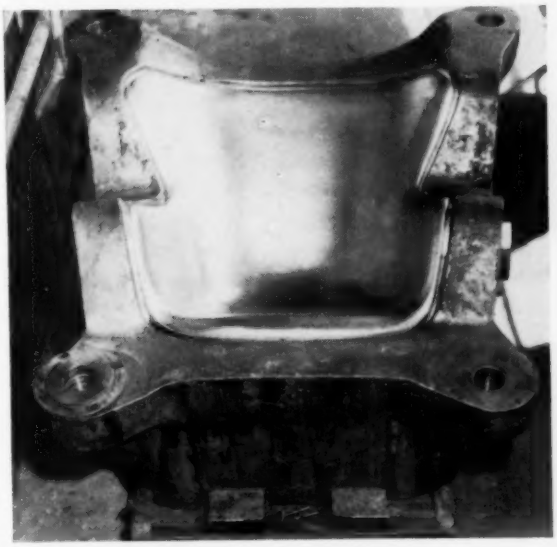

Fig. 4. A casting with a smooth finish but where lustre is not too important.

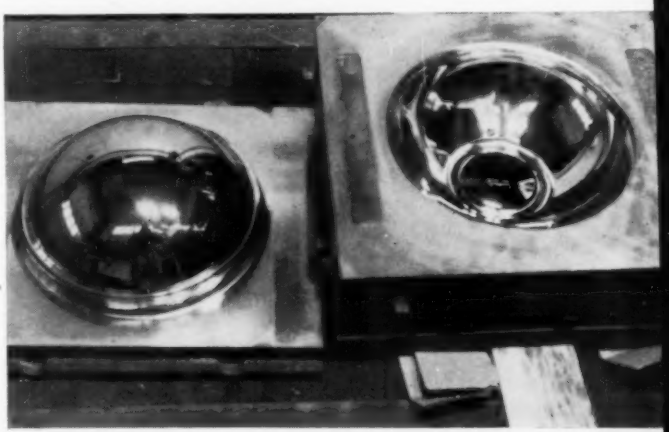

Fig. 5. A very high finish as is evidenced by the degree of reflectivity.

Fig. 6. Lustre-brushing for a final finish.

polishing cloths, polishing compounds and pastes, and flexible shaft machines as well as hand units of the Dumore type.

An ideal polishing sequence for the optimum finish on steel such as required on a lens mold or a melamine dish mold can be as follows:

1. Stone. Select No. 100 to 400 grit depending on surface conditions. Never start with any coarser stone than is necessary.
2. Assuming one has gone through a No. 400 stone in sequence 1, use a No. 600 and an 800 to complete stoning operation.
3. Bristle brush polish using lanolin based paste and No. 900 grit until all stone lines have been removed.
4. Hard sewed wheel polish using fast-cut stainless steel compound.
5. Soft wheel polish using high color compound such as chrome oxide green rouge.

The above sequence will eliminate any pitting or dragging of surface and produce a mirror finish. When a finish of lesser degree is permissible, the above routine can be cut short at any point to fit into the order of the day.

The diamond compounds so widely used for mold polishing have specific recommendations from their respective manufacturers. The sequence naturally follows from coarse to finer abrasives as any other polishing routine. The diamond methods are considered faster by some mold makers and are definitely more expensive than the previously outlined method.

Beryllium copper molds are usually delivered with a vapor-blast surface which in many cases is all the finish required. For a high lustrous surface a polishing with a felt bob and tripoli compound after stoning will usually suffice. The same

Fig. 7. A well lighted polishing bench, featuring the overhead flexible shaft machines.

medium for aluminum will usually be satisfactory. For a high final lustre, a soft muslin wheel and a lime compound should be used.

The prehardened steels usually polish well with a minimum of effort if the non-dragging methods described earlier for regular steels are employed.

STANDARDS

Some companies have set standards of finish but these are not sufficiently universal. There is no doubt but that the industry could talk much more intelligently—finish wise—with a set of these standards available to everyone.

Standards could be based on brush analyzer or profilometer values or to coincide with the term common to the mold maker, namely, micro-inch. A misconception of finishes and their importance to the ultimate product would automatically be cleared up as the whole industry became value educated. Cost reduction, as well as better understanding, would then be inevitable.

Arthur W. Logozzo has long been prominent in AES affairs. He was 1949–1950 national president of the Society, is a past president of Hartford Branch AES, and has served on the Editorial Board of PLATING. Mr. Logozzo is the president of his own plating plant, the Nutmeg Chrome Corporation, West Hartford, Connecticut.

He is also active in the Society of Plastics Engineers and was educational chairman for its 1953 Annual Conference, as well as a past president of Western New England Section. Mr. Logozzo is chairman of constitution and bylaws revision of SPE, serving the same function as he performed for the AES in 1948.

Arthur Logozzo has presented technical papers at five AES National Conventions and at two SPE National Conferences. He has also talked before most of the AES branches and many of the SPE sections.

RECENT DEVELOPMENTS IN GOLD ALLOY PLATING

by DR. EDWARD A. PARKER*

Recent developments in gold alloy plating have been due largely to the growing ramifications of the electronics field.

Gold antimony alloys are used in the transistor field while the connector field is using gold nickel alloys for anti-galling surfaces. To eliminate delamination by standard gold plating procedures, the printed circuit field is using gold silver alloys which permit plating at room temperature and very low free cyanide. All of these alloys contain 95 percent or more gold.

UP TO A FEW YEARS AGO the principal interest and demand for gold plating was in the decorative field. Costume jewelry provided the largest demand.

Formulations were for dilute solutions[1] since most of the applications specified only color. Occasionally there were specifications for an acid test. In general, the concentration was one to five pennyweights (0.4–2 g/l)** of gold per gallon for both tank and barrel plating.

In spite of the development of precise methods of control so necessary for the production of vast quantities of costume jewelry and other decorative items, there was no incentive for the development of solutions for the production of heavy plates of gold and gold alloys according to the available literature. Although there are probably many reasons for this, the major one in the jewelry field was the restrictive labeling regulations of the F.T.C.[2] In essence, these regulations stated that regardless of the weight or quality of a gold alloy electrodeposit, the only label permitted was "Electroplated Gold."

If the gold alloy, however, was applied mechanically, then the label could state both the karat and the weight per cent of the gold alloy. From the standpoint of wear and corrosion resistance, this was quite misleading since the thickness of the gold alloy layer decreased as the gauge of the basis metal decreased while the label remained the same, ie, 14K, 1/20.

Thus, while the plating of the other metals and their alloys developed rapidly during the past thirty years, the deposition of heavy gold and its alloys was dormant.

The revival of interest in this field in the last decade has been due mainly to the demand for improved gold deposition by the electronic, communication and control equipment fields.

At first, the demand was only for pure gold, that is 100 per cent or 24K gold, because it had electrical conductivity almost as good as silver but practically none of its tarnishing problems. As requirements arose for improved corrosion resistance, heavier and heavier coatings of gold were required. This use still accounts for 99 per cent of the gold used in this field.

With still further developments, other properties became important and alloys of gold had to be developed to meet these requirements.

The particular gold alloys that will be discussed are those developed for the three following fields:

(1) The transistor field desired trace amounts of the Group III and Group V elements for use in junction boundaries with the semi conductors.

(2) The connector division had trouble with the gold-to-gold contact seizing and galling. Gold nickel alloys on one or both surfaces minimized this problem. However, for higher frequencies, nickel is very bad and work is underway to determine what other alloys may be suitable.

(3) The printed circuit field has had considerable trouble with delamination in attempting to use standard gold plating baths and those containing high free cyanide. The high gold-silver alloys eliminated this defect by allowing plating to proceed at room temperature and at low free cyanide.

Another field which is just opening is that of high temperature applications. Here it would appear that metals or alloys which slow down the normal rate of diffusion at high temperatures are what is required but at present the field is wide open.

The following description of these several alloys must be considered only as a progress report as the work on all of them is in its infancy and it is the writer's opinion that advances in everyone of them will be quite rapid in the next ten years.

DOPED ALLOYS

The first discussion of the transistor pr nciple was by M. Faraday in the 1830's but was then forgotten until W. Shockley of Bell Telephone Laboratories rediscovered the principle in 1945. The first working models were made the following year and in 1949 the first commercial transistor was sold. The hearing aid industry was the first major user, mainly because their requirements best fitted the first transistors, low frequency and low power requirements.

The two types of transistors under discussion are called "n" and "p". The "n" type has an excess of electrons and thus is negative. Current is transferred by these electrons. The addition of Group III elements, arsenic and antimony, to the germanium will produce the "n" type.

The reverse is true of the "p" type. There is a deficiency of electrons and thus may be designated positive. The addition of Group III elements, gallium, indium, produce the "p" type.

To make the essential part of the transistor, the doped alloy, extremely small amounts of Group III or V elements were added to a melt of high purity germanium. From this "doped" melt, single crystals were grown and subsequently sliced to produce the very thin doped wafer of germanium.

These tiny wafers are extremely fragile and it was difficult

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** The heterogeneous system of units used in this paper is that in common use in this field—troy weights for gold, avoirdupois weights for common salts such as cyanide, carbonate, etc. and gram or milliliter for small amounts of base metals or special addition agents.

to plate or to solder connections. In late 1952, Dr. Rediker of the M. I. T., Lincoln Laboratories, proposed a less tedious method of preparation. If it were possible to plate a gold antimony alloy with a controlled amount of antimony on a Kovar disc or washer to a thickness of 0.0002–5 in., then a pure germanium wafer could be placed on top of the plated disc and heat fused at 500C with no flux.

At the time Dr. Rediker's proposal was forwarded to this laboratory, the only use of antimony in gold solutions was in the production of antique gold finishes.[1] From the information on the quantities of antimony involved, the following formula was devised:

Gold (as potassium gold cyanide)	20.0 dwt/gal (8.1 g/l)
Potassium Cyanide	4.0 oz/gal (30 g/l)
Potassium Carbonate	4.0 oz/gal (30 g/l)
Dipotassium Phosphate	4.0 oz/gal (30 g/l)
Antimony	30 to 60 mg/gal (8–16 mg/l)
Temperature	130–150F
Current Density	1–10 ASF
Agitation	Preferred for high current density
Thickness	0.000050–0.001 in.

Plates produced under the above conditions gave excellent results electrically. In addition, the plates were clean and adherent and had excellent gold color.

For barrel plating the above formula was retained except that the gold concentration was reduced to 8 dwt per gallon, and current density in a barrel was limited to one to three amperes per sq ft. The current efficiency ranged from 70 to 90 per cent.

Although it had been postulated originally that two percent antimony was necessary the replenishment in the above solution was calculated on the basis of 0.5 per cent. After some time in use it was found that even this was high and now specifications call for a replenishment based on 0.2–0.3 per cent. From the original use of the words "doped alloys" for the slightly contaminated germanium, its use has been extended to cover all the gold alloys used in conjunction with transistors such as the above gold antimony, gold indium, etc. The resulting transistor is much less susceptible to the after etching solution of CP4 (a mixture of nitric, hydrofluoric, acetic and bromine) or electrolytic alkali used for cleanup purposes. The "yield" of working transistors is materially increased by this process.

The minimum amount of antimony required is not known. Actually, only a few parts per billion are required in germanium but with the gold present the natural "p" properties of gold have to be overcome first. Amounts greater than one percent antimony in gold alloys produce a smutty, dirty brown plate. Increasing amounts produce a non-adherent plate.

In the manufacture of transistors more than one percent antimony in the gold alloy will produce a brittle ternary alloy at the junction when fused to the germanium wafer. In the worst cases the ternary alloy will fracture and break away from the germanium. Antimony in amounts of 0.5 to 1.0 per cent in the gold alloy will make the alloy "ball up" and refuse to wet the germanium when it is attempted to fuse the wafer to the plated disc. Below 0.3 per cent antimony the natural wetting of gold and germanium is restored. This property of wetting or filleting is desired as it eliminates any leakage around the germanium wafer. The inclusion of salts or solution in this inaccessible point will corrode and ruin the transistor sometime after the unit has been placed in operation.

The filleting of the gold alloy plate is used as a control test on the antimony content. Gold containing as little as 0.001 per cent still retain the "n" type properties.

INDIUM

The "p" type transistors are made by adding small amounts of Group III elements, gallium, indium and thallium. The demand has not been great since it has been found that gold alone will impart sufficient "p" properties.

Indium cyanide added to gold solutions will sludge out in a few days time. EDTA solutions of indium are very stable and do not sludge on standing for one year. The plating rate is slow, and plating from a 1.2 oz/gal will barely cover a gold plated disc in one minute at 30 ASF. Therefore, to obtain the order 0.1 to 0.5 per cent indium in the alloy plate it is necessary to add five grams indium, as the EDTA complex, to the twenty pennyweight gold formula listed under the antimony bath. All the other conditions remain the same except that naturally there is no antimony present.

NICKEL

In the decorative field, practically all flash gold alloy plating solutions contain some nickel or cobalt. The major effect with regard to appearance, is to lighten or pale out the gold color (produce Hamilton shades). In addition, nickel tends to reduce the crystal size and gives a surface with less porosity and thus, a more acid resistant surface for a given thickness.

In the field of low frequency electrical connectors, gold nickel alloy plates have found use as anti-galling surfaces and also give good tarnish resistance, even for 0.000010 in. coatings. The presence of nickel in the gold lattice materially reduces the diffusion of silver through the gold layer. A pure 24K gold plate 0.000010 to 0.000020 in. thick on silver will allow the silver to diffuse through the gold plate and in a few months the plated articles would be dark.

The major portion of such gold nickel plating is done in barrels. One typical formulation for thin coatings is the following:

Gold	2–3 dwt/gal (0.8–1.2 g/l)
Nickel	1–2 g/gal (0.26–0.52 g/l)
Free Potassium Cyanide	3–5 oz/gal (22.5–37.5 g/l)
Potassium Carbonate	4–12 oz/gal (30–90 g/l)
Dipotassium Phosphate	3–5 oz/gal (22.5–37.5 g/l)
Temperature	120–140F
Current Density	3–5 ASF
Time	5–7 min for 0.000010 in.

The percentage of nickel in the plate is 0.5 to 2 per cent. The lower percentages are preferred because of the yellow color. Increasing nickel content darkened the plate. As the thickness increases, this darkening effect took place at lower and lower nickel contents. Increase in current density will increase the nickel content.

The chemistry of the nickel complexes and the deposition mechanism in this solution are practically unknown. Generally, it is recognized that some finite time is required for the ageing of solution in order to obtain alloys of uniform deposition. For most metals, such as gold-silver, gold-copper, etc., this ageing process is fairly short. However, it has been found with barrel gold nickel alloys that for a given bath composition, the plate the first day contained less than 0.1 per cent nickel. After one week of operation, the nickel content of the plate was 0.5 per cent and after one month of operation the plate analyzed 1.0 per cent. This was in spite of maintaining constant metal content in the bath throughout

the test month. This situation illustrates some of the problems of solution control.

With such dilute solutions another important variable is the size of the perforations in the barrel. With 1/32 in. performations, there is practically no transfer of solution.

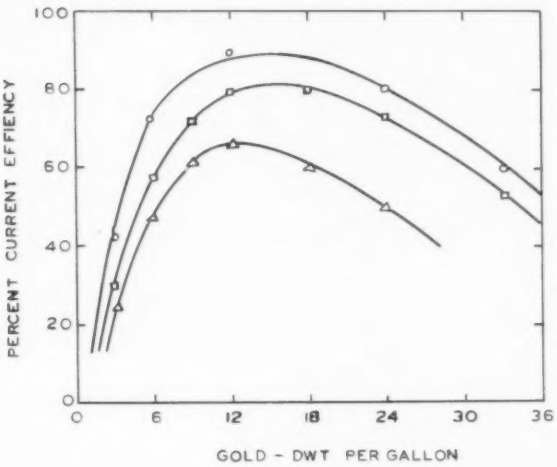

Fig. 1. Percent current efficiency vs gold content of barrel plating solutions
Temperature 135–145F
○ = 1 asf
□ = 3 asf
△ = 5 asf

As an example of this, two loads, one twice the area of the other, were plated under the same conditions, current density and amp hr/sq. ft. The amount of gold plated per load was the same and thus, the larger load had one-half the thickness. This quantity also corresponded closely to three-quarters of the gold content of the enclosed solution in the barrel. Under such conditions, and a plating time greater than four minutes, the plate was very unsatisfactory in appearance. After two to three minutes, only nickel was plating. One method of correcting this is to lift the barrel every two minutes to drain and then allow to refill. Another method would be to continuously pump fresh solution into the barrel and thus, force the partially spent solution through the perforations.

For plates heavier than 0.000020 in. it is necessary to increase the concentration of the solutions. A satisfactory formulation is:

Gold, as Potassium Gold Cyanide	8 dwt/gal (3.27 g/l)
Nickel, as Potassium Nickel Cyanide	4 g/gal (1.03 g/l)
Free Potassium Cyanide	4 oz/gal (30 g/l)
Potassium Carbonate	4 oz/gal (30 g/l)
Dipotassium Phosphate	4 oz/gal (30 g/l)
Temperature	140F
Current Density	1–3 ASF

The percentage of nickel is usually less than one percent and at least from cyanide baths must not be allowed to exceed one per cent or the plate will be quite dark.

* Current efficiency was determined in the usual manner, actual deposit divided by the theoretical amount of deposit according to the ampere hours consumed multiplied by 100. Since this is barrel plating it is not possible at the present to determine the true current density. Therefore, for this study the apparent current density was used in the calculation of current efficiency. The apparent current density is the total current per load divided by the total area of the load.

Fig. 1 demonstrates the effect of concentration of gold on the current efficiency* of gold plating in a barrel. This curve applies equally well to gold, gold nickel, gold antimony, gold silver and gold copper solutions. The decrease in efficiency at high concentration was not anticipated but is probably tied up with the normal decrease in throwing power as the concentration is increased. Another bad result of the high concentration is the non-uniform deposit especially on long narrow items.

In any production plating, current efficiency, or more properly the apparent current efficiency, must be determined for each item. The size and shape of the item, how it tumbles or moves, together with the size of the load and the amount of exposed or platable area at any given time are the major mechanical factors which control the apparent current efficiency.

Quite uniform thicknesses are obtainable on equidimensional items. However, where the ratio of dimensions may reach 20–50 to one then all the operating details must be watched carefully in order to obtain reasonable uniformity.

SILVER

Gold-silver alloys have been used in the past, mainly for the production of green colored deposits. In the past few years, these alloys have found a new use in gold plating at room temperature. The color of the plate is in the 24K range and the composition is 95 per cent gold, or better. The hardness is practically double that of ordinary 24K gold. After the

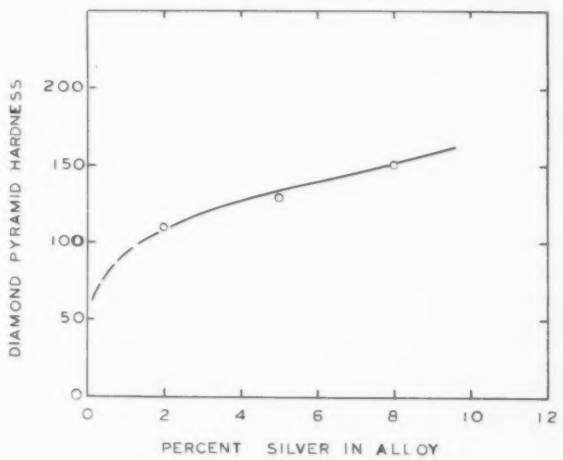

Fig. 2. Diamond pyramid hardness vs per cent silver in alloy. Thickness of plate is 0.0015 in. or greater. Hardness determined by Knoop Indenter and converted to DPH. (Hardness measurements courtesy of Bell Telephone Laboratories and Western Electric Co.).

first sharp increase in hardness, the hardness increases linearly with increase in silver content as demonstrated in Fig. 2. Various values are given in the literature for 24K gold but these are usually cast and annealed samples and not electroplated.

Harr[3] found that on plating at room temperature and a current density greater than 15 ASF, the 0.002-in. thick eight per cent silver alloy could not be formed or stamped satisfactorily. By plating at 180F, satisfactory physical properties could be obtained even at 30 to 40 ASF. However, the

greatest interest so far in gold silver alloys has been in the one to three per cent silver range. The plate retains most of its original surface characteristics, brightness, smoothness, etc., up to thickness of 0.001–2 in.

To operate the gold-silver alloy baths at room temperature without agitation, the gold content has to be over 25 dwt/gal. The free cyanide can be operated at 0.1 to 15 oz/gal. The low values are preferred for laminated items such as printed circuits. Such plates, even as thin as 0.000050 in., serve as excellent resists in the etching of printed circuits. With agitation, the gold content can be as low as 10 dwt. but much better results are obtained at 20 to 40 dwt/gal. In general, the silver content of the alloy increases as the current density is decreased. This is demonstrated in Fig. 3 by examination at any given silver concentration.

For a given set of conditions agitation increases the silver content of the plate several fold. At 1 asf without agitation the silver content of the plate is 3.8 per cent while under the same conditions an agitated solution will produce a plate containing 20 per cent silver. At slightly lower current density the alloy plate will be white in a vigorously agitated solution.

In barrel plating reduced gold concentrations (8–12 dwt/gal) are preferred. Reduced throwing power as discussed under the nickel gold alloys is the main reason. At low free cyanide, less than one ounce per gallon, the color, while fairly uniform on equi-dimensional items, can be quite non-uniform on long, narrow items at room temperature.

Operating at a temperature of 120–140F the finish is a uniform mat texture, which however is readily ball burnished to a bright surface. The use of high free cyanide, greater than 10 oz/gal, will produce a uniform color at room temperature but the work must be rinsed thoroughly immediately or the plate will darken or even turn black. In many cases, it is not possible to leach out the dark color.

MISCELLANEOUS

Very little has been done with the other alloys of gold in this country. In Europe work has been concentrated on the red alloys. Work there shows that if the copper-cyanide ratio was increased over that in $K_2Cu(CN)_3$ the copper content in gold alloys plates was increased. This increase was best done by reducing the *p*H from 11–12 to the 6–8 range through the addition of acid. Furthermore, it was found that under these conditions the alloy was of a solid solution type and thus less susceptible to corrosion than the standard pink gold produced at *p*H's above eleven.

The above gold-copper alloys are finding use in Europe as decorative plates for watch cases. The conventional mechanical-clad gold alloys lose thickness at their most important wear points, due to stretching of the metal to form corners or high areas. In addition, such stretching introduces stress patterns (orange peel) which require further loss of metal by polishing to return the surface to a high finish. It is the natural tendency of a plated coating to be thicker on the areas which would receive the most wear, i.e., high areas and edges.

Alloys with other metals have hardly been touched. This situation, however, will change greatly in the next few years as there are indications that small percentages of several metals increase the hardness considerably. One of these indications is found in a recent patent[4] suggesting the use of molybdenum and uranium.

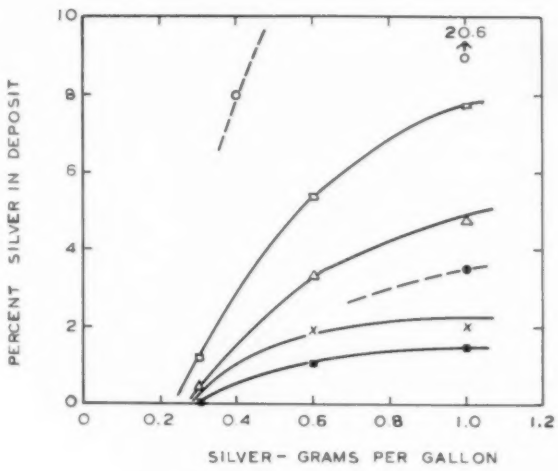

Fig. 3. Percent silver in deposit is silver in plating solution
○ = 1 asf with agitation
□ = 3 asf with agitation
△ = 5 asf with agitation
× = 7 asf with agitation
● = 1 asf, no agitation
■ = 2.5 asf, no agitation

In order to take full advantage of any well formulated plating solution, the preparation of the basis metal is most important although rarely fully appreciated.

The largest single cause for failure of otherwise good electroplates in atmosphere tests relates to the defects produced in the forming, stamping or drawing of the original item.

Burrs, feather edges, pits, "burned" or metallurgically unsound metal are the defects which may be introduced at this stage. The burrs and feather edges will tend to draw excessive amounts of current and result in still larger projections. Because of the high current the plate will tend to be unsound. If the handling or assembly after plating is rough, then there is a good chance that these edge defects will break off exposing the basis metal. If the item is barrel plated such breakoffs may occur at almost any point during the cleaning, plating, drying cycle or in use. At best, the plate would be thin on these areas, in some there would be no plate, in others a long sliver may project from the piece because of a partial breakaway from the part.

Ball burnishing after plating would tend to exaggerate the problem of breaking off the burrs and feather edges. Increasing the time of burnishing would increase this tendency. In some cases, the edges with their plate would be peened over, tending to trap solutions providing later corrosion problems. Sharp right angle shoulders with no radii would tend to round off or be peened over by burnishing.

Therefore, to correct the problem it should be certain that:

(1) Tools are sharp at all times in order to get clean cuts rather than tearing the metal apart and leaving a feather edge.

(2) The stock, before entering a screw machine, a stamping press or other forming machine, is clean and as free of pits and other defects as is commensurate with the quality required.

(3) All feather edges and burrs are removed by an abrasive treatment. The size, shape and quantity will dictate the details of the method. All edges should be given

slight radii. In a recessed angle such radii facilitates normal buildup of plate. With an acute recess angle or a long right angle the plate will tend to bridge over the angle as it builds up.

Items for barrel plating should be ball burnished after the excess edges are removed by abrasive stone tumbling. Then no damage will occur in the barrel during plating. The gold plate will then be continuous and much more resistant in any corrosion test.

The above discussion has referred to the macro surface finish. More recently the importance of the micro surface has been demonstrated by Faust[5] and his co-workers in their work on the protective value of electroplates at high temperature. In a later paper Faust[6] coins the phrase "Surface Metallurgy" and discusses "mechanical cleanliness." This category covers the weak, low tensile strength surface skin which, if left, will be the weak point in the adhesion of the plate to the basis metal.

The low strength metal is due to distortion, smearing and tearing of the surface by various mechanical treatments. Metallographic photographs of these surface defects and their effects on the resulting copper electroplate were also given in this latter article.

If the item must be heat treated it is mandatory that the item be cleaned thoroughly from both organic and inorganic films before entering the heat treating bath or furnace. If not, then considerable unsound metal or metal compounds are formed which must be removed before plating.

After the above treatments the items are now ready for the standard cleaning cycle.

In the plating solution there are just as many critical items. Replenishment cannot be left to guess work. Even an amperehourmeter is not infallible. It can run slow or fast, just as the speedometer in your car or the ammeter on any piece of electrical equipment. This is especially so in the low current range, less than ten percent of rated capacity of the meter. Best results are obtained by using it at the midpoint of the rated capacity. However, under all conditions it should be considered mainly as a guidepost and not the answer to all problems. If it is used mainly for replenishment as it usually is in flash plating, the solution should be analyzed frequently to check not only the accuracy of the meter but also as a check on unauthorized changes in procedure.

In heavy plating it is used to control both the thickness of plate (amp hr per load) and the replenishment. The thicknesses should be checked and the composition of the solution determined frequently. In addition to the usual variations due to changes in procedures and "cutting corners," certain organic or even inorganic impurities will reduce the current efficiency by as much as 90 per cent.

In barrel plating the introduction of impurities is very easy and has to be guarded against with extreme faithfulness.

Accidents are bound to happen and work is dropped into the plating tank either from carelessness or faulty equipment. If this spillage is immediately removed then most of the damage is just the waste of time. However, if such removal is put off for any of several reasons, then real damage can be done through contamination of the solution by other metals and by loss of gold due to immersion plating. Such deposits are spongy and considerable gold can be lost in a short time.

The present trend toward rigid enforcement of specifications is making it mandatory that all these precautions be taken in order to obtain the full effects of the electroplated coating.

As just one example, what advantage is it to meet the thickness specifications when there are feather edges or burrs. With the first use, or maybe even in burnishing, they will be knocked off or at least turned over. The result is an open spot of the basis metal.

Specifications have attempted in the past to describe significant surface as that area which can be touched by a 0.75 in. diameter sphere.

Those who have seen electrical connector pins and sockets and take into consideration the present trend towards miniaturization will realize at once that such terminology has no relation to the actual service life.

Thus, more and more corrosion tests are being discussed as replacement for the present specification or better yet, as an addition so that the specification has some relation to serviceability. However, as a word of caution, it is just as bad to specify salt spray tests if the item has to only remain on a shelf in normal shop atmosphere or is going to be put immediately into a piece of equipment that is hermetically sealed.

Much explorative work still remains to be done in this field to arrive at the best possible laboratory test for service life under all the various conditions which can exist.

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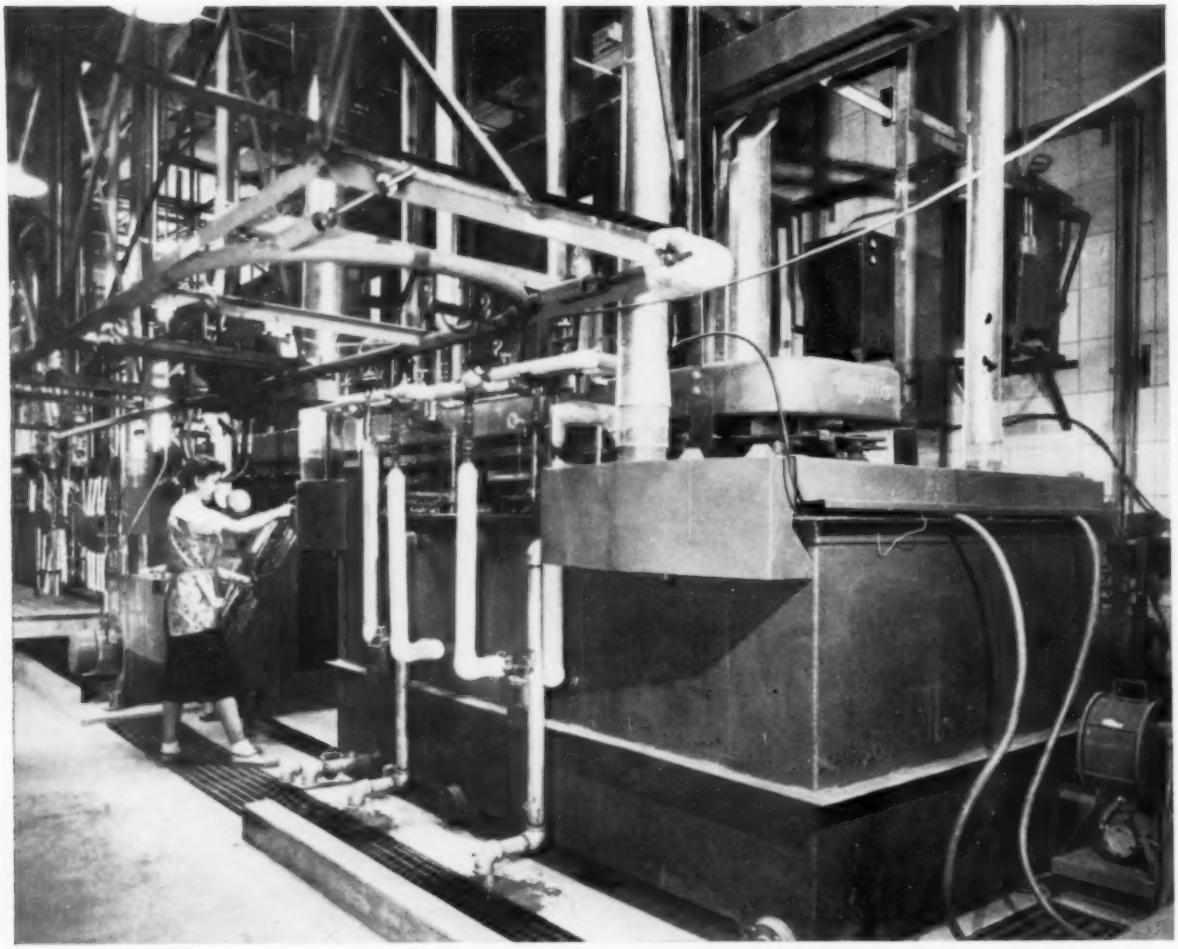
Dr. Edward A. Parker obtained his education at the University of Illinois where he received the degrees of BS in 1930, MS in organic chemistry in 1932 and PhD with thesis on X-ray diffraction in 1937. Following appointments as Textile Foundation Fellow (1935–1937), with Long Island Biological Association (1937-1939) and as Atlas Powder Fellow (1939–1941), he entered the plating field in 1941 when he joined the consulting firm of A. Kenneth Graham and Associates. He then became associated with Alrose Chemical Company, which he left in 1945 for his present position as Technical Director of Technic, Inc. Dr. Parker is an active member of the Providence-Attleboro Branch, AES, having served in the capacities of secretary-treasurer, president and on the Paper Awards Committee.

He is a member of the Research Project Subcommittee No. 12 from inception to date, the AES Scientific Achievement Award Committee, former member of the Editoral Board of Plating and the AES Research Committee; Dr. Parker received the AES Gold Medal Award in 1952.



Operator loading the racks on the automatic carrier

IN-PLANT PLATING PROVES ECONOMICAL

"AUTOMATIC PLATING gives us more production, good quality control, and lower costs," says W. E. Stevens, vice president in charge of production at the Norgren-Stemac, Inc. of Denver, Colo.

The Norgren-Stemac organization manufactures product identification nameplates which are used for automobile dealer identification, by original equipment manufacturers for model and type designation, by outboard motor and boat manufacturers, refrigerators, washing machines, ranges, vacuum cleaners, etc. This type of manufacture represents approximately 90 per cent of the total business.

Since the organization of the company in 1946, it has farmed-out its plating operations to processors who were able to fill the needs. With the tremendous volume growth which the Stemac Company has experienced, however, it became evident that having the plating done outside was no longer advantageous.

Time was of the essence. If a manufacturer wanted a large order to be filled in a short period, while the casting division could produce it, the time alloted would not permit further processing outside the plant.

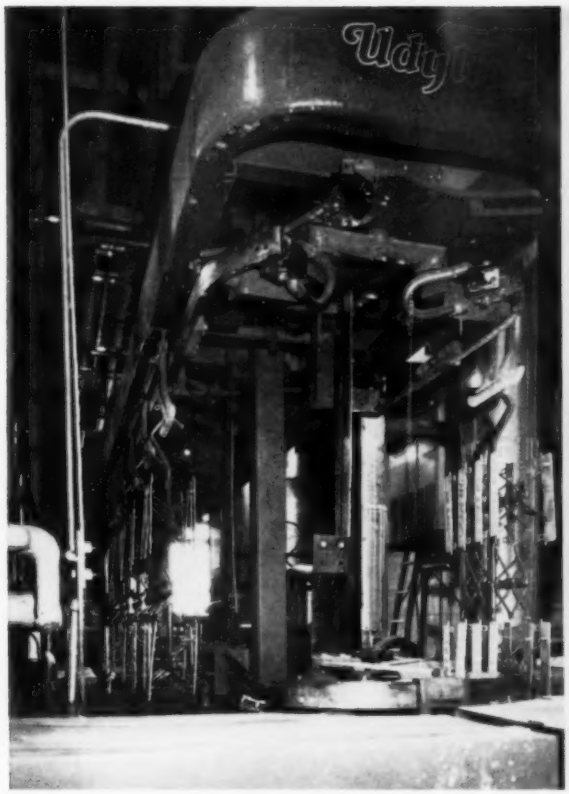
"In addition to the economy of simplified handling," Mr. Stevens relates, "we faced a problem of quality control in filling orders to specifications. That gave us three powerful reasons for specifying this equipment when we decided to take over the plating ourselves."

In taking over the plating operation, Norgren-Stemac, Inc., was enabled to control production within the company, thus allowing the company to set up its own production schedules, varying them to fit the specific needs of any particular time.

Another important factor was quality control which is now achieved by the fully automatic equipment.* Not only does it move work from one tank to another, but it also controls the solution temperatures, flow of current and timing of each step in the process, and assures a better quality plating joy since thickness of each coat is controlled far more accurately than is possible with ordinary equipment.

Only two workers are required to operate the automatic plater; one girl to load the racks of unplated work on the machine and remove the racks of finished work as they return

*Cyclemaster, manufactured by Udylite Corporation, Detroit, Michigan.

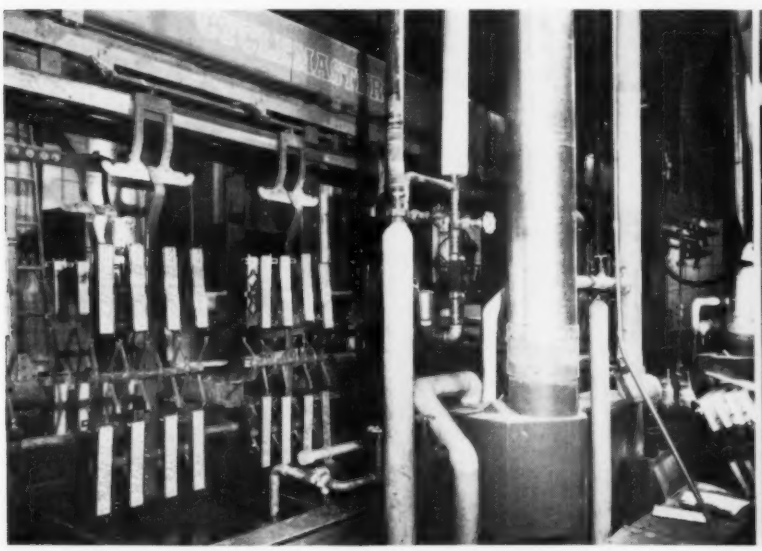


Machine in up position transferring the racks

Vice President Stevens shows type of work plated at his plant

to the starting point, and one qualified plater to keep constant check on the various baths and solutions and make any required adjustments.

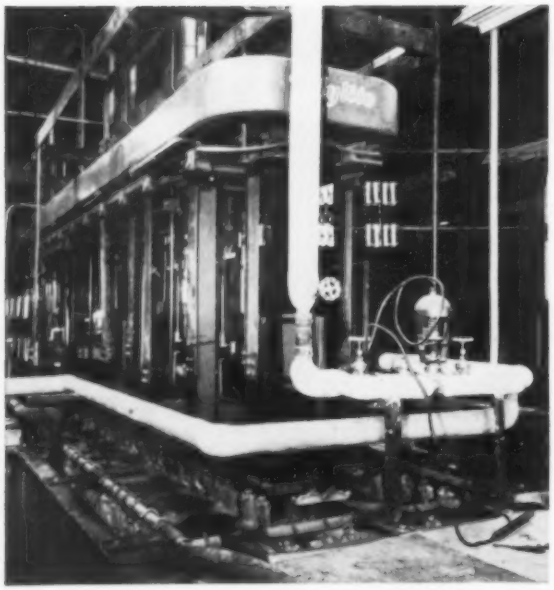
The operator's attention is required only at the beginning and end. She loads the rack of cleaned, unplated castings on the machine's automatic carrier, which then moves to the anodic cleaning tank, where the rack remains for 48 seconds. The next step is a 48-second rinse and spray, followed by a 48-second acid dip and then another 48-second rinse and spray. Then the rack moves into the copper strike tank, where an initial layer of copper is applied under heavy current during the 120 seconds it remains there.



Side view of the 43-ft machine showing the racks in up transfer position

Girl removing racks from machine

Operator adjusting dwell time on the control panel



End view of the machine in raised position

After that, the rack is transferred to the copper plate tank, where the copper base is slowly built up for 912 seconds. Next comes a 48-second dragout, followed by a 48-second rinse and spray, a 48-second acid dip, another 48-second rinse and spray, and thence to the nickel plating tank, where the rack remains for 840 seconds.

Emerging from the nickel plate tank, it goes through a 48-second rinse and spray, and then into the chrome plate tank, where it stays for 120 seconds. Then comes a 48-second hot rinse, after which the rack moves into a drying tank, where it stays for 264 seconds, and back to the load-unload point, where it comes off the line in 72 seconds.

This entire cycle, allowing for time in transfer between tanks, takes just over an hour from start to finish, and with this process running at uninterrupted flow, the machine delivers 60 finished racks per hour, which is its minimum capacity. The machine is held to this minimum to insure that the plating will match manufacturer's rigid specifications. For lighter, decorative plating however, the machine can be speeded up to produce up to 80 racks per hour.

"In all," notes Mr. Stevens, "the capacity of the equipment exceeds our present requirements allowing a healthy margin for expansion, in addition to creating opportunities for us to do high-precision plating on a jobbing basis for others."

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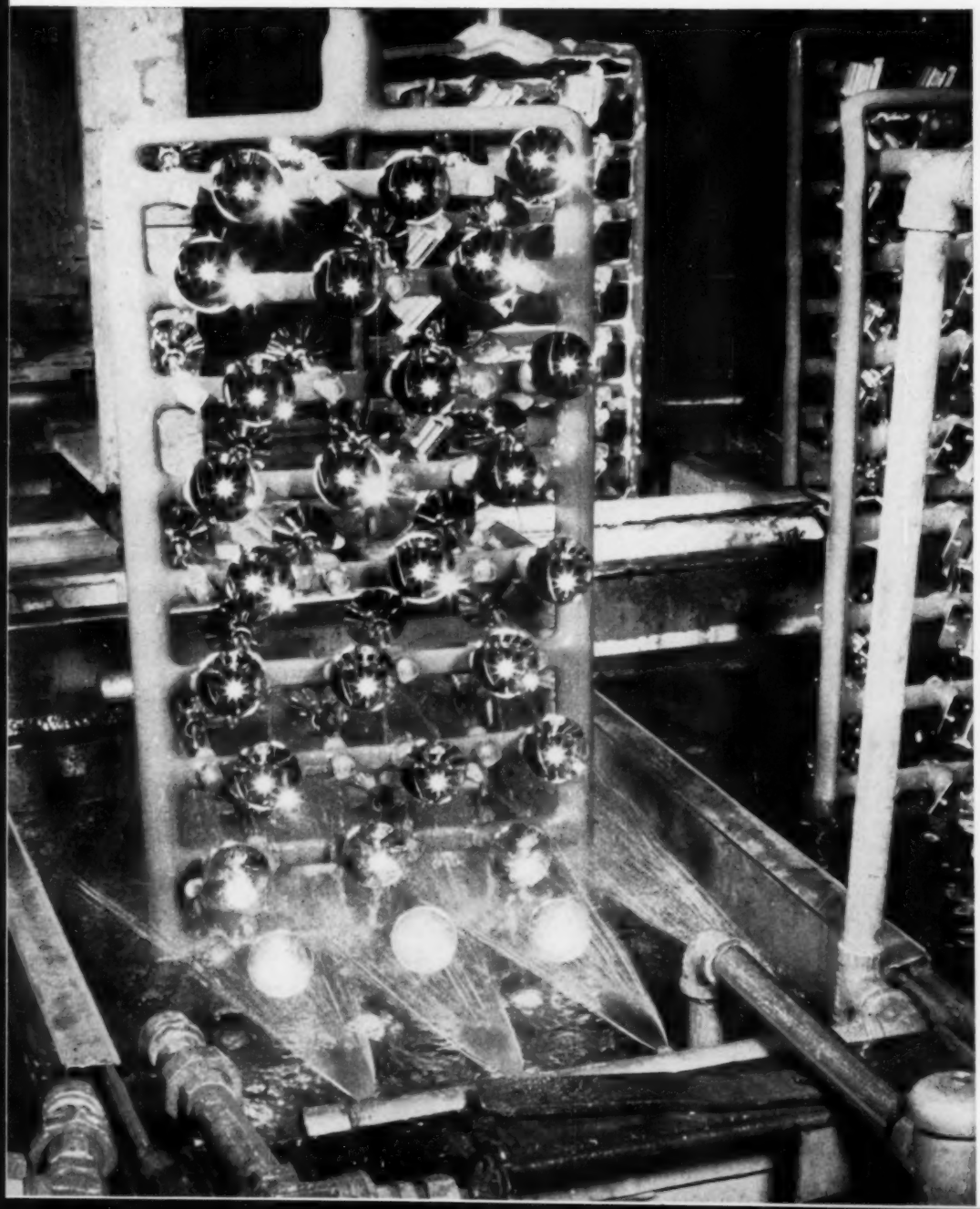

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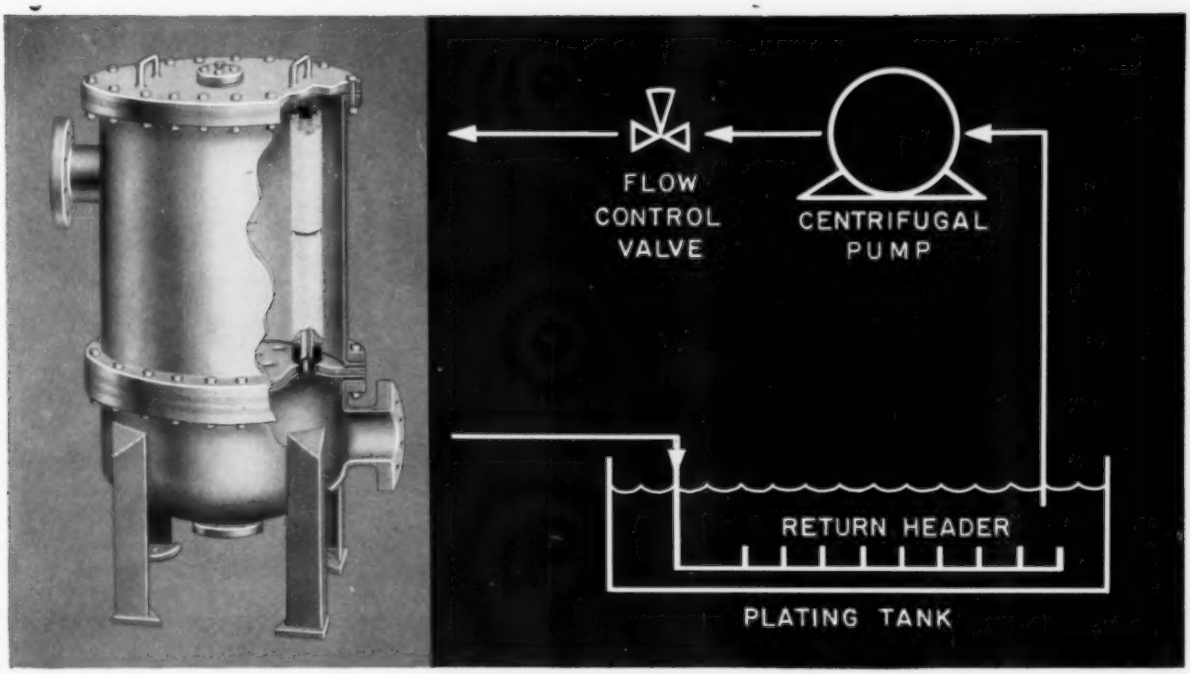

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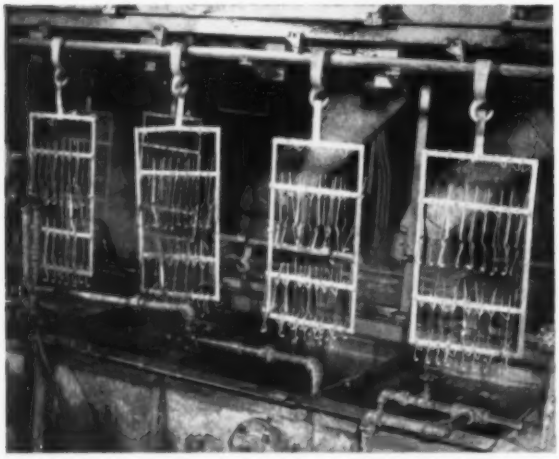

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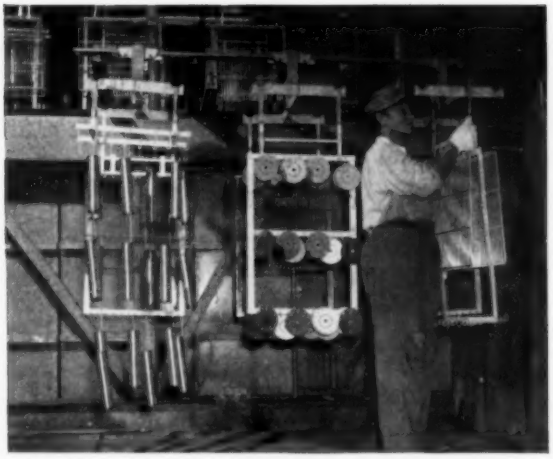

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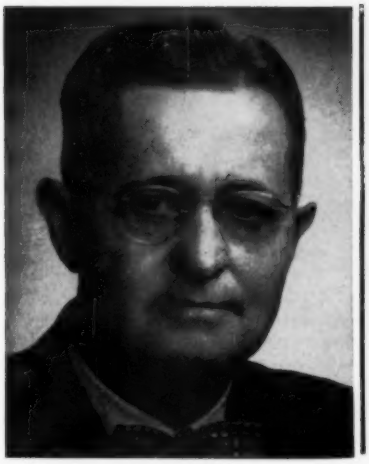


Ralph D. Wysong
First Vice President

Herberth E. Head
President

Dr. W. Andrew Wesley
Second Vice President

1958-1959
NATIONAL OFFICERS

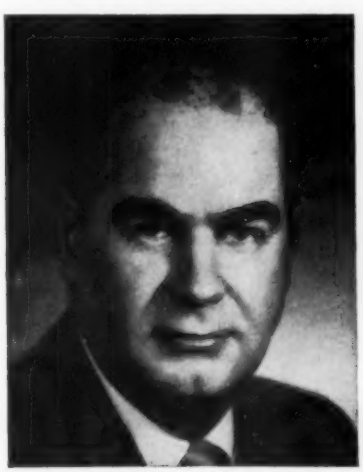
Elected at the Cincinnati Convention meeting of the Supreme Society, May 22, Herberth E. Head, Chrysler Corporation, Detroit, Michigan succeeded Francis T. Eddy as National President of the American Electroplaters' Society, Inc.

The Supreme Society also elected Ralph D. Wysong, Studebaker-Packard Corporation, First Vice President; Dr. W. Andrew Wesley, International Nickel Co., Second Vice President and Chester G. Borlet, Grand Rapids Brass Co., Third Vice President.

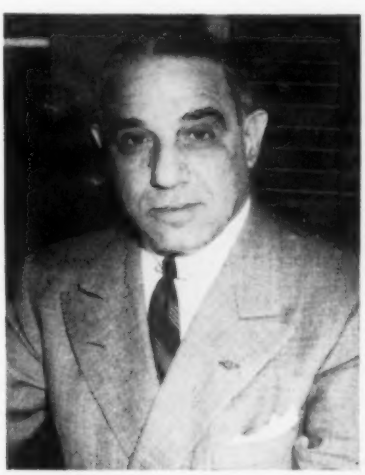
Mr. Eddy will serve on the Executive Board as Past President and John P. Nichols continues as National Executive Secretary

To these, PLATING extends its congratulations and its best wishes for effective and resultful tenure.

Chester G. Borlet
Third Vice President



Francis T. Eddy
Past President



John P. Nichols
Executive Secretary

THE FABULOUS STORY OF WILLIAM BLUM

WILLIAM BLUM WAS BORN in Philadelphia on December 28, 1881, and was educated in the public schools of Philadelphia. When he graduated from the Central High School, he received a scholarship to the University of Pennsylvania where he studied chemistry under Dr. Edgar Fahs Smith, who was one of the earliest Honorary Members of the AES. And in his senior year, Dr. Blum studied electroanalysis which initiated his interest in electrochemistry.

From 1903 to 1909, he taught chemistry at the University of Utah where he came into close contact with the copper and lead mines and smelters. In connection with studies on smelter smoke pollution, he frequently climbed 250-foot smelter stacks to sample the discharged gases. (This was the greatest height he attained until, in later years, he became addicted to flying in airplanes.)

During the summer vacations and the academic year of 1907–1908, he was a graduate student at the University of Pennsylvania where he received his Ph.D. in 1908.

In 1909, he became a chemist at the National Bureau of Standards (NBS) in Washington, D.C., where he engaged in analytical researches under Dr. W. F. Hillebrand, a world-famous analytical chemist. In 1913, he was assigned to investigate the cause of certain difficulties encountered in the copper electrotyping baths at the U.S. Government Printing Office. During the next few years, he studied the factors involved in the operation of these baths and published the results in NBS Circular 52.

ATTENDS HIS FIRST AES CONVENTION

The close similarity between electrotyping and electroplating led him to attend, in 1915 in Dayton, Ohio, the Convention of the American Electroplaters' Society (AES) which he then joined and with which he has since been so closely associated. He has missed only one AES Convention since 1915.

During World War I, to meet the needs of military agencies on electroplating problems, three experienced electroplaters, all members of the AES were added to the staff of the NBS Electroplating Section viz: Fred J. (Dad) Liscomb; Thomas F. Slattery and George B. Hogaboom. The latter association led to the joint preparation in 1924 of the first edition of "Blum and Hogaboom," a title more often used than "Principles of Electroplating and Electroforming." This book was revised in 1930 and again in 1949.

During the interval from 1913 to 1951 when he retired, Dr. Blum directed the work of the NBS Electrodeposition Section, in which a total of over 100 men and women have been employed. Many of these persons continued their interest in electrodeposition after they left the Bureau to accept industrial positions. Over 100 technical papers on plating were published by the group, chiefly in "Monthly Review" of the AES (today's PLATING); the Transactions of the Electrochemical Society, and the Journal of Research of the National Bureau of Standards.

HONORS BESTOWED

Dr. Blum has been richly rewarded by numerous honors in recognition of his scientific activities. The AES made him an Honorary Member in Philadelphia in 1919, partly in recognition of three papers presented there on war-time studies in which Liscomb, Slattery and Hogaboom cooperated. In 1928, the AES presented him with a gold watch which he uses regularly and cherishes highly. He is also an Honorary Member of the AES Research Committee in which he still takes an active part.

He is an Honorary Member of the Electrochemical Society of which he was President in 1926. In 1944, this Society presented him with the Acheson Medal.

The Institute of Metal Finishing (formerly the Electrodepositors' Technical Society) conferred Honorary Membership upon him, and he presented the Hothersall Memorial Lecture and received the Hothersall Medal in London in April, 1954.

He has taken an active part in the work of Committee B-8 of the ASTM in the preparation of specifications for electroplated coatings. In 1951, the ASTM gave him an "Award of Merit."

The University of Pennsylvania conferred the honorary degree of Doctor of Science upon him in 1953, and the Franklin Institute of Philadelphia awarded him the Elliot Cresson Medal in 1953.

In 1926, the American Institute of Chemists awarded their first medal to him for "Distinguished Governmental Service." In 1951, the U.S. Department of Commerce presented him with a medal for "Outstanding Contributions to Science."

During both World-Wars I and II, and since the latter conflict, he has served as an advisor to the War and Navy Departments, and since 1951, he has been a part-time consultant to Frankford Arsenal in Philadelphia and Rock Island Arsenal in Illinois. In 1951 Frankford Arsenal made a special unique award to him for his service in this capacity.

In 1953, the American Chemical Society awarded him a certificate for 50 years membership and made him an "Emeritus Member."

KNOWN INTERNATIONALLY

Dr. Blum has become well acquainted in the field of electrodeposition in other countries. In 1935, he presented a paper to the Faraday Society in London and visited many plants and laboratories in England, France, Germany and Holland. In 1953, he spent four months on a trip to Australia and New Zealand, where he gave over 25 lectures on plating and related subjects to AES Branches and to other scientific societies, and visited many plants and laboratories. In 1954, Mrs. Blum and he spent three months in England and the Continent after the International Conference on Electrodeposition and Metal Finishing in London in April.

Dr. Blum says that the best thing about his long career is that he has had lots of fun and has made many friends in electroplating and related fields.

Dr. William Blum

POTOMAC SCIENTIST GETS HIS "JUST DESERTS"

by

JOHN P. NICHOLS

THAT LEAN, GREY, KINDLY scientist from the shores of the Potomac finally got his "just deserts." And so deservedly did his "just deserts" meet that lean, grey, kindly scientist from the shores of the Potomac, and such a large segment of the American Electroplaters' Society (AES) exulted and exults over the doing, that the story needs telling from beginning to end—from background to deed.

Actually, the saga starts back in September 1956.

At an Executive Board meeting late that month, the Board decided it was high time that the AES created a super award ("super" in the same sense as the military's Congressional Medal of Honor) to recognize and honor truly distinguished scientific service to the field of electroplating, metal finishing and allied arts.

There was Board agreement that such recognition should annually be meted not for a single glorious achievement but for consistently outstanding performance by a respected AES member over a long span, say at least a decade or more.

The Board liked its idea but being properly cautious chose to check its judgment—did so via a committee headed by Past President Kenneth M. Huston and including Myron B. Diggin, Dr. Charles L. Faust, Dr. Walter R. Meyer, Cleveland F. Nixon and Dr. Louis Weisberg.

AES's HIGHEST AWARD BLUEPRINTED

Espoused by that Committee, and blueprinted by it, the proposed prize, labeled "AES Scientific Achievement Award," became a reality when its proposed rules and regulations were approved by the Board, then were enacted by the Supreme Society at its Montreal Annual Meeting, June 20, 1957.

Under the Award's provisions, AES Branches, annually, would nominate AES members who by their "decade plus" accomplishments, either advanced the theory and practice of electroplating, metal finishing and allied arts—raised the quality of processes and products—or enhanced the dignity and status of the profession.

Those provisions created a "Scientific Achievement Award Committee" charged with the responsibility of choosing among nominees. The first selectee's identity would be announced at the 45th Annual Convention in Cincinnati in May 1958, and he would deliver a lecture at the AES's Golden Jubilee Convention in Detroit in June 1959. Aside from a scroll and other honors, he would then also receive a $500 cash honorarium from the General Fund of the Society. That pattern would be repeated yearly.

The lecture was titled "William Blum Lecture," a popularly acclaimed decision.

AWARD HARNESSED AND FIRST WINNER ANNOUNCED

Upon Supreme Society enactment, the project leaped into action. To that high-honor selection committee, the Board appointed Dr. Abner Brenner, Leslie L. Diveley, Dr. Russel E. Harr, Dr. Samuel Heiman, Leland M. Morse and Dr. Edward A. Parker. Dr. Harr was elected Chairman.

Summer turned to autumn and, by deadline, Branches nominated nine AES stalwarts. And by the time autumn had faded to winter and winter had blossomed to spring, the Committee had made its choice—unanimously. It selected and tapped for his "just deserts," that lean, grey, kindly scientist from the shores of the Potomac.

At the Cincinnati Annual Meeting, announcement of the deed was tumultuously acclaimed.

Hence, as the AES climaxes its Fiftieth Anniversary observance in Detroit in June 1959, the first "William Blum Lecture" will be delivered there by the first "AES Scientific Achievement Award" winner—by that lean, grey, kindly scientist from the shores of the Potomac, Dr. William Blum.

Dr. William Blum

EIGHT OTHERS VIED FOR SCIENTIFIC ACHIEVEMENT AWARD

Aside from William Blum, the winner, eight other stalwarts of the AES were honored by Branch nomination for the Society's highest Award, namely Arthur E. Carlson, Thomas Evans, Dr. Charles L. Faust, Lloyd O. Gilbert, Dr. A. Kenneth Graham, Dr. Samuel Heiman, Dr. Abraham M. Max, Dr. Louis Weisberg.

Under the rules of the Award, these may be nominated again by Branches for consideration of the AES Scientific Achievement Award Committee.

Dr. Russel E. Harr, the Committee's Chairman, made the announcement of the Committee's selection of Dr. Blum as the Award's first winner. Other members of the Committee included Dr. Abner Brenner, Leslie L. Diveley, Dr. Samuel Heiman, Leland M. Morse and Dr. Edward A. Parker.

To succeed Messrs. Diveley and Morse whose tenures expired, the Executive Board has named to that Committee for three year terms, Myron B. Diggin and Dr. Louis Weisberg.

Myron B. Diggin

Dr. Louis Weisberg

GOLDEN ANNIVERSARY

OPENING ACTIVITIES AT THE 45TH AES ANNUAL CONVENTION

(1, 2 & 3) Busy registration quarters on Sunday afternoon, May 18 at the Hotel Sheraton-Gibson, Cincinnati. (4) The Executive Board in session on Sunday morning, l to r, Dr. Samuel Heiman, past president; Ralph D. Wysong, second vice president; Herberth E. Head, first vice president; Francis T. Eddy, president; John P. Nichols, executive secretary; Dr. W. Andrew Wesley, third vice president. (5) Credentials Committee: Manson Glover, Dr. W. Andrew Wesley, Herberth E. Head, Francis T. Eddy, John P. Nichols, Edward Bruck, Duke Dent, Ralph D. Wysong and William K. Murray. (6) Members of the AES Scientific Achievement Award Committee, l to r, Leslie L. Diveley, Dr. Edward Parker, Dr. Russel E. Harr, chairman and Dr. Samuel Heiman. (7) General Convention Chairman Charles Wise, at the podium, officially opening the Convention. (First Row) l to r, Dr. Russel E. Harr, Ezra A. Blount, Vice Mayor of Cincinnati, William Cody Kelly, Louis Michelson, Mr. Wise, Francis T. Eddy, Mrs. Robert D. Miller, Leonard A. Chesworth, Herberth E. Head. (Second Row) George Taylor, new president NAMF; Dr. M. M. Beckwith, president MFSA; Dr. W. Andrew Wesley, Dr. Samuel Heiman, Robert D. Miller, W. Wilson Loveless, John P. Nichols. (8) Vice Mayor Kelly welcoming the convention. (9) Dr. Russel E. Harr announcing Dr. William Blum first winner of the AES Scientific Achievement Award. (10) Dr. William Blum responding to the honor bestowed upon him. (11) The Opening Session in the Roof Garden. (12) President Eddy calling the Business Meeting of the Supreme Society to order. L to r, Dr. W. Andrew Wesley, Dr. Samuel Heiman, John P. Nichols, Francis T. Eddy, Herberth E. Head, Ralph D. Wysong. (13) National Executive Secretary John P. Nichols at Roll Call. (14) The Business Meeting, looking toward the dais. (15) Detroit Branch displays AES Golden Anniversary gold banner. (16) Attentive Delegates at Supreme Society meeting. (17) At the Get-Together Party. Number 17 rests on G. Ross Davidson, 1957 Montreal General Convention chairman. (18) President and Mrs. Francis T. Eddy. (19) Third Vice President and Mrs. W. Andrew Wesley. (20) Mrs. and Second Vice President Ralph D. Wysong. (21) National Executive Secretary and Mrs. John P. Nichols and John Jr. (22) Convention Co-chairman and Mrs. Ezra A. Blount. (23) Convention Chairman and Mrs. Charles Wise. (24) Carlos A. Piedrahita, Barranquilla, Colombia, South America and Miami Branch President Duke Dent.

EXTRACTS FROM THE PAPER AWARDS COMMITTEE'S REPORT

"As directed, the Paper Awards Committee considered the papers that appeared in PLATING for the eleven-month period covered by the issues of April 1957 through February 1958 inclusive and in addition, the papers published in the AES Proceedings for 1957. We operated under the revised directions concerning this committee work as published on page 993 of the September 1957 issue of PLATING under the section entitled 'Appendix.'

"We are making no selections for the following awards, as in these cases less than the minimum of three papers in each category were available for judging as stipulated under section 3b of the regulations: the Hogaboom Memorial Award for the paper on nickel plating, the Chromium Plating Award, the Precious Metal Plating Award and the Hanney Memorial Award for the best paper on copper plating. As stipulated in the Appendix, the Paper Awards Committee for the following year should take into consideration the papers that appeared during this past eleven-month period in making their selections for these four awards . . .

"We regret that there were not sufficient papers in the specialized categories so that a full complement of awards could be made. However, we could see no reason for requesting that the new regulations for the awards be waived."

AES PAPER AWARDS COMMITTEE

F. O. BEUCKMAN
B. C. CASE
H. L. KELLNER, CHAIRMAN

Dr. Abner Brenner

Dr. Clara de Minjer

Dr. Roy C. Spooner

HONORED AT THE SOCIETY'S 45TH ANNUAL CONVENTION

THE AMERICAN Electroplaters' Society bestows eight awards for original technical and scientific contributions that have appeared in PLATING and "Technical Proceedings" during the fiscal year just ended. The Paper Awards Committee appointed by the Society's National President, selects these papers on the basis not only of their immediate value to the plating and metal finishing industries but also of the technical and scientific value and originality of their subject matter and the clarity of their presentation.

The 1958 winners follow:

THE CARL E. HEUSSNER AWARD (AES GOLD MEDAL)

For the best paper printed in Society publications during the fiscal year. Consists of Gold Medal, certificate and $250. Co-sponsored by AES and the United Platers' Foundation, Glen H. Friedt, Trustee.

Awarded to: "Studies on Electroless Nickel Plating" by Dr. Clara H. de Minjer and Dr. Abner Brenner, National Bureau of Stantards (PLATING, December 1957 issue, p. 1297).

THE AES SILVER MEDAL

For the second best PLATING or Convention paper during the fiscal year. Consists of Silver Medal and $150. Sponsored by AES.

Awarded to: "A Study of Application Techniques in the Use of Liquid Buffing Compounds" by S. L. Henn and E. T. Candee, Lea Manufacturing Co. (Technical Proceedings, 1957 Edition, p. 102).

THE AES BRONZE MEDAL

For the third best PLATING or Convention paper during the fiscal year. Consists of Bronze Medal and $50. Sponsored by AES.

Awarded to: "The Sealing of Sulfuric Acid Anodic Films on Aluminum" by Roy C. Spooner, Aluminum Laboratories Limited (Technical Proceedings, 1957 Edition, p. 132).

THE ROBERT S. LEATHER AWARD

For the best paper on the subject of mechanical finishing appearing in Society publications during the fiscal year. Consists of certificate and $50. Sponsored by AES and the Lea Manufacturing Co.

Awarded to: "Taking the Guesswork Out of Grinding and Polishing with Abrasive Belts" by Warren K. Seward, The Carborundum Company (PLATING, January 1958, p. 39).

For the reasons specified in the adjoining report by the Paper Awards Committee, the George B. Hogaboom Award, the Chromium Plating Award, the Precious Metal Plating Award and the John J. Hanney Memorial Award were not this year awarded.

Ellsworth T. Candee

Spencer L. Henn

Warren K. Seward

AES NEWS

CHALLENGE OF OUTER SPACE THEME OF MILWAUKEE ANNUAL MEETING

With a theme, "The Challenge of Outer Space" and featuring three experts discussing timely technical subjects of wide Branch interest, the AES's Milwaukee Branch conducted its Annual Meeting at the Schroeder Hotel of that municipality before a large audience of Branch members and guests from other Branches, Saturday, April 26, 1958. Leslie L. Diveley served as Technical Sessions Chairman.

Harold Mueller, chief process engineer of the A. C. Sparkplug Division of the General Motors Corp. (Milwaukee plant) presented, "The Precision Cleaning and Deburring of Missile Guidance Components."

He was followed by Milton A. Glaser, vice president and technical director of the Midland Industrial Finishes Co. who discussed "Modern Organic Finishes for High Temperature and Abrasive Protection."

Robert Bair, of the Sodium Products Division of E. I. DuPont de Nemours & Co., Inc., pinch-hitting for Dr. Donald Swalheim, supervisor of that division, concluded the Educational Session's phase of that Milwaukee Annual Meeting with a paper titled, "Recent Developments in Copper Plating."

John P. Nichols, the Society's National Executive Secretary, was the guest luncheon speaker at the well-attended Annual Meeting Luncheon at which Branch President E. H. McCoy presided.

Among other Branches represented were Chicago, Rockford and Mississippi Valley. A large number of Branch members, their wives and guests enjoyed the impressive Annual Meeting banquet and dance held at the same hotel that evening.

E. E. Piellusch headed the Educational Committee that ably arranged the Technical Sessions. Other Committee heads included Fred Anderson and Edward J. Weiss, banquet; Phil Ritzenthaler, entertainment; Frank Marshall, luncheon; Earl Koy, hotel; Ted Sobczynski, publicity and Glenn Schwemer, financial. Henry Bornitzke and Robert Steuernagel composed the Advisory Committee.

GROUP OF DELEGATES MEET AT HARTFORD ON APRIL 12

Left to right: Ellsworth T. Candee, Waterbury; Manson Glover, Boston; Ralph McCahan, Hartford; Edward J. Garland, Waterbury; Robert G. Parker, Bridgeport; Chester G. Borlet, Grand Rapids; William Lindsay Jr., Bridgeport; Richard C. Barrett, Bridgeport; National Executive Secretary John P. Nichols; Richard O. Watson, Grand Rapids.

Robert A. Ehrhardt

Raymond L. Mitchell

James H. Lindsay

Walter E. Moline

William H. Safranek

Dr. D. G. Foulke

EDITORIAL BOARD AND RESEARCH COMMITTEE RECEIVE STRONG NEW HANDS

Highly qualified men were selected by the Executive Board and announced by National President Francis T. Eddy at the First Business Session of the Supreme Society, Cincinnati, May 19 as replacements for members of the Editorial Board and of the Research Committee whose three-year terms expired at that meeting.

To succeed John B. Capuano, Dr. Russel E. Harr, Past President Arthur W. Logozzo and Fremont L. Scott, the Board named to the Editorial Board, Robert A. Ehrhardt, James H. Lindsay and William H. Safranek.

Past President Walter L. Pinner, as Host Branch Educational Chairman of the 1959 Detroit Convention also takes a place on that Board for 1958–1959 succeeding Robert D. Miller, Host Branch Educational Chairman of the Cincinnati Convention.

Raymond L. Mitchell, Walter E. Moline and Dr. D. Gardner Foulke were appointed to the Research Committee for three year terms succeeding Robert A. Ehrhardt, George E. Best and Dr. Walter L. Meyer.

To retiring hands, PLATING joins in the Society's thanks for splendid tenures. To the new, it extends its confident best wishes.

The Executive Board's appointments to the Educational, Membership, Public Relations and Publications Committees will be announced by PLATING in its July issue.

NEWARK ELECTROPLATING CLASS RECEIVES DIPLOMAS

Front Row, left to right, Walter Alina, Hy Koretsky (proxy for George Apgar), Philip Bishop, Robert Corsini, Darrell Martin, Flavio J. La Manna, chairman, Charles Hellriegel, James Lind, Gus Bittrich, president of Newark Branch, James Lo Monte, Amilcare Sepa, Charles Shutt. **Back Row:** Max Idel, Harold Bauer, Matthew Bolembach, William Brown, Al Miller, John Cullinane, Robert Groom, Louis Marino, Elmer Welsh, James Mitchell, James Myron, Joseph Wismer. Not present when picture was taken: Charles Carew, Eleanor Duffy, Irving Bernstein, Carl Rutgers, William Foos, Donald Gumm, Arthur Chryst, Frank Squillaro, George Apgar, John Rosellini, George Phillips, John Ruthven, Frank Acker, Darwin Hillegass, Walter Vuurens, Arthur Monczka, George Bastory, Joseph Miller.

ELECTROPLATING COURSE CONDUCTED BY NEWARK BRANCH

by F. J. LA MANNA

The Newark Branch Electroplating Course recently completed another successful term at a graduation ceremony, at the Robert Treat Hotel on April 11, 1958, before a large "Ladies Night" turnout. Framed diplomas, lettered in Old English, were awarded to the 39 graduates.

SESSIONS OF THE NEWARK BRANCH 1958 SPRING COURSE

Date	Subject	Speakers	Site
2–11–58	Introduction to Plating Fundamental Calculations	Dr. D. S. Carr F. J. La Manna	Sel-Rex Corp. Nutley, N. J.
2–18–58	Metal Cleaning & Pickling	G. A. Lux	Oakite Products New York, N. Y.
2–25–58	Polishing and Buffing	J. McGrievey	Behr-Manning Co. Teterboro, N. J.
3– 4–58	Barrel Finishing	P. E. Kirchartz W. P. Nunn	Metal Finish Inc. Newark, N. J.
3–11–58	Electrocleaning and Phosphate Coatings	G. A. Lux	Oakite Products New York, N. Y.
3–18–58	Copper & Dull Nickel	Dr. D. S. Carr M. Di Chiara	Royal Plating Co. Newark, N. J.
3–25–58	Bright Ni and Chromium	L. J. Donroe	Pyro Metal Finishing Newark, N.J.
4– 1–58	Analysis and Control	Dr. D. G. Foulke	H-VW-M Co. Matawan, N. J.
4– 8–58	Precious Metals Plating	E. C. Rinker	Sel-Rex Precious Metals Nutley, N. J.
4–15–58	Cadmium & Zinc Plating	J. C. Kosmos	Kosmos Electro-Finishing Research Hackensack, N. J.
4–18–58	Presentation of Diplomas	G. A. Bittrich F. J. La Manna	Robert Treat Hotel Newark, N. J.

The course was similar to the first course given in 1955, with some modifications, and included instruction in cleaning, pickling, barrel finishing, polishing and buffing, plating, purification, analysis, and chemical calculations. The lectures were given on successive Tuesdays at various industrial plants and laboratories in the Newark-New York area in order to combine plant tours with lectures, and to enable the students to see the latest equipment and processes being used commercially in the metal finishing industry. The instructors who lectured in their own field of specialization were members of the Newark Branch, and in most cases, members of the firm at which the class was held. All were voluntary contributors to the course, and they cooperated fully with the committee to make the course interesting and informative.

For a nominal registration fee of $20, each student received a copy of the "Newark Branch Electroplating Course Manual," the "Metal Finishing Guidebook," and various pamphlets and technical literature pertaining to the particular phase of metal finishing being covered at the specified meeting. Most of the students bought copies of Graham's "Electroplating Engineering Handbook," and several students also purchased other recommended textbooks.

After each session, homework was distributed covering the fundamentals of the subject just presented. These assignments were graded and returned to the students

at the following class. The average mark for the 39 students, who ranged in educational background from college graduates to shop workers with limited education, was 90.5 per cent. The highest average was attained by Joseph W. Miller of Bart Laboratories & Design, Inc., Belleville, with a 99.5 per cent average. The lowest average was 71.0 per cent. Much of the homework enabled the student to make use of the manual, handbook and guidebook as reference material, so that he would become more familiar with these tools to help him solve everyday plant problems.

MANUAL PREPARED

The "Electroplating Course Manual" was a compilation of each instructor's lecture (also including those lectures discontinued from the 1955 course), and was edited by Dr. Dodd S. Carr in a question and answer form. It proved of great aid to the students in helping them to understand the complexities of metal finishing.

The plant visitation type of course has proved to be very successful in Newark. The first two times it was presented, in the fall of 1955, and again in the spring of 1956, a total of 77 students were registered. Most of these students, not already members of the AES, became members of the Newark Branch after the courses were completed. When the latest course was proposed, interest again ran high and 42 students were registered, of which 39 graduated. The attendance record for the 10 sessions was an exceptionally high 91.94 per cent average, even though the area had been besieged by blizzards and bad weather during February and March. It is evident that this type of course is more popular in the Newark area than the conventional type of course presented in the fall of 1956, at a local high school chemistry laboratory. That course lacked the interest and enthusiasm shown by the students this year.

The companies that participated not only gave of their knowhow and facilities, but also generously provided refreshments after each session. This augmented the lecture and plant tour by doubling as an informal question and answer period.

At the end of the course, diplomas were awarded to the graduates at a special ceremony during a Newark Branch meeting. Questionnaires were mailed to the students asking them to evaluate certain phases of each lecture as they benefitted from it. These suggestions, criticisms, and general appraisals will form the basis for improved future courses.

The Spring 1958 Electroplating Course Committee included: Gus Bittrich, early chairman of the committee and now president of the Branch; Flavio J. La Manna, later chairman; John Banta, Dr. Dodd S. Carr, Robert A. Ehrhardt, Al Korbelak and Robert Horrocks.

NATIONAL PRESIDENT RECEIVES TRADITIONAL AWARD

Presentation of the "Order Of The Pot," an honor traditionally accorded retiring Presidents, to National President Francis T. Eddy by Past President Kenneth M. Huston, at the Annual Banquet and Dinner Dance of the Baltimore-Washington Branch on April 12, 1958, at Baltimore. Left to right are: Lancaster Lowry; Branch President Ed Bertucio; President Eddy; Ken Huston; Branch Secretary-Treasurer Ed Oberland, and Branch Vice President Carl Thiede.

RALPH F. SCHOLBE, PLATING'S NEW ADVERTISING MANAGER

Ralph F. Scholbe has joined PLATING MAGAZINE'S staff as advertising manager effective May 5, 1958.

Formerly an advertising executive of the Miller Freeman Publishing Co., publishers of nine trade magazines, Mr. Scholbe had charge of advertising sales for that company's marine industry magazine, "The Log", in its Eastern and Midwestern territories.

Well known in the advertising agency field, his two-decade advertising record also includes service as Eastern advertising manager of World Petroleum Magazine. For some years before that he was Eastern space sales representative of the Detroit News, the Booth chain of newspapers of Michigan, the Washington Star, the Indianapolis News and the Des Moines Register and Tribune.

A graduate of the Illinois Institute of Technology with a degree in engineering, Mr. Scholbe brings rich technical familiarity to his PLATING advertising position.

NEW ENGLAND REGIONAL TECHNICAL SPEAKERS AND CHAIRMEN

The 19th Annual New England Regional, one of its most successful, was held at the Hotel Statler, Hartford, Conn., on April 12. It is composed of five Branches: Hartford, Springfield, Waterbury, Bridgeport and New Haven. Left to right, Frank Tirendi, educational chairman; Patrick Mazzamaro and Henry A. Strow, True Brite Chemical Products Co.; Dr. W. Andrew Wesley, International Nickel Co., AES 3rd vice president; Isidor Cross, technical chairman.

4TH ANNUAL EMPIRE STATE REGIONAL MEETING AT ROCHESTER

(Top left) Participants in the Organic Finishing Educational Session, left to right, Ezra Blount, session chairman; James W. Cornelius, Paul O. Blackmore and Gerry Lux, speakers at the session. (Top right) Attentive listeners at the Organic Session. (Lower left) Speakers and chairmen at luncheon prior to the Educational Sessions. (Lower right) The Banquet dais. Left to right, Gerald A. Lux, William M. Tucker hidden by Mrs. Tucker, Clarence H. Sample, AES First Vice President Herberth E. Head, General Chairman Frank O. Beuckman, Mrs. Beuckman, Second Vice President Ralph D. Wysong, National Executive Secretary John P. Nichols.

TWO EDUCATIONAL SESSIONS AT EMPIRE STATE REGIONAL

New York State AES members, their wives and guests, including three national officers, attended the 4th Annual Empire State Regional Meeting at the Hotel Manger in Rochester, N. Y., on Saturday, April 19. The national officers present were Herberth E. Head, first vice president; Ralph D. Wysong, second vice president and Executive Secretary John P. Nichols.

Empire State Regional is now composed of six AES Branches: Buffalo, Capitol District, Mohawk Valley, Rochester, Southern Tier and Syracuse. Mohawk Valley is a new Branch member since the last Regional Meeting.

Two Educational Sessions were held concurrently in the afternoon. Frank O. Beuckman, Rochester Branch president and general chairman of the meeting, spoke briefly to both sessions.

The Platers' Session was chairmanned by William H. Tucker. Morris A. Tardiff, manager of general equipment sales, Hanson-Van Winkle-Munning Co., presented a paper on "Factors Governing the Choice and Selection of Materials for the Plating Room." Clarence H. Sample was the next speaker. His paper dealt with "Recent Developments in Decorative Plating." Mr. Sample is electroplating section head of the Development and Research Division, International Nickel Co. The concluding paper, "Practical Applications of the Kanigen Process," was delivered by Paul Talmy, director of research and development, Kanigen Division of General American Transportation Corp.

The Organic Finishing Session, an innovation this year, was conducted under the chairmanship of Ezra Blount, editor of "Products Finishing." James W. Cornelius, vice president of Newcomb-DeVilbiss Co., discussed "Organic Finishing Equipment—Its Use and Selection." "Pretreatment of Metals for Organic Finishing" was presented by Gerald A. Lux, technical education director of Oakite Products, Inc. A sound and color movie, "Color Magic," was shown. Commentary was provided by Paul O. Blackmore, sales promotion manager, Interchemical Corp.

The ladies attended a luncheon in the Lilac Room of the Manger. During the afternoon, a Fur Fashion Show was provided for their enjoyment by the Ladies Committee, of which Mrs. Frank O. Beuckman was chairman.

The banquet followed by dancing until the early hours brought to a fitting close an Empire State Regional meeting that will be difficult to match in future years.

Other members of the committee were: Edward Wallin, educational; Robert L. Flint and Joseph Hull, program; Edward Wallin and Vern Schaeffer, publicity; R. Minard and Al King, ticket; Don Blu, housing; Fred Thiem, entertainment; Ray Berghold, John Lenzi, Fred Johnson, reception.

BUFFALO REGIONAL HOST IN 1959

The Empire State Regional Board, composed of delegates of the American Electroplaters' Society Branches of New York State, met at a luncheon meeting in Rochester, April 19, 1958, prior to the educational session. Fred Thiem, of the Rochester Branch, presided. The Buffalo Branch will be the host Branch for the 1959 Regional meeting. Fred Goeckel, Trico Products, was appointed Chairman, and Rolland Campbell, Proto Tool Company, was appointed Secretary.

DETROIT MAKES SPECIAL CONTRIBUTION TO RESEARCH

Manifesting its continued substantial interest in the AES Research Program, the Detroit Branch recently made a special Branch contribution to the Research Fund totaling $100. This contribution is, of course, over and above the "$1 per member per fiscal year for Research" included in the per capita tax fee of every AES member.

The Detroit Branch's generous contribution is the fifth since April 1, 1957. The four Branches that also have made such special contributions in that period include Cleveland ($500); Central Michigan ($100); Toronto ($100) and Western Ontario ($100).

FINANCIAL REPORT

FOR THE FISCAL YEAR ENDED MARCH 31, 1958

AMERICAN ELECTROPLATERS' SOCIETY
445 BROAD STREET
NEWARK 2, NEW JERSEY

We have examined the balance sheets of the General Fund and Research Fund of American Electroplaters' Society, Incorporated (New Jersey Corporation) as of March 31, 1958, and the related statements of income and principal for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

The accompanying balance sheets and statements of income are exclusive of certain accounts described in the notes appended thereto.

In our opinion, the accompanying balance sheets and statements of income, except as indicated above, present fairly the financial position of American Electroplaters' Society, Incorporated at March 31, 1958, and the results of its operations for the year then ended, in conformity with procedures generally followed by similar organizations, on a basis consistent with that of the preceding year.

CLYDE A. ZUKSWERT & CO.
Certified Public Accountants

Newark, New Jersey
April 16, 1958

FINANCIAL STATEMENT OF THE SUPREME SOCIETY OF THE AMERICAN ELECTROPLATERS' SOCIETY, INC.

EXHIBIT A — **Comparative Balance Sheet—General Fund—March 31, 1958 and 1957**

ASSETS	March 31, 1958 "Society" Control	March 31, 1958 "Plating" Control	March 31, 1958 Total	March 31, 1957	Increase Decrease*
CURRENT ASSETS:					
Demand deposits	$27,248.99	$16,172.08	$43,421.07	$42,732.81	$688.26
Petty cash	50.00		50.00	50.00	
United States Treasury bonds:					
Series K	9,660.00		9,660.00	9,660.00	
3¼%, 6/15/83–78 (at cost)	15,682.20		15,682.20	15,682.20	
Time deposits	110,000.00		110,000.00	110,000.00	
ACCOUNTS RECEIVABLE:					
Advertising, books, reprints, supplies and miscellaneous	5.25	5,619.64	5,624.89	8,788.17	3,163.28*
Advances, conventions and exhibitions	5,137.30		5,137.30	3,235.00	1,902.30
Due from Research Fund		285.68	285.68	230.00	55.68
Prepaid expenses	1,107.73	6,293.06	7,400.79	6,687.62	713.17
Total current assets	$168,891.47	$28,370.46	$197,261.93	$197,065.80	$196.13
CONTRA ACCOUNTS:					
Due from "Society" control		$51,726.30			
Due to "Plating" control	($51,726.30)				
DEPOSIT, AMERICAN AIRLINES	425.00		425.00	425.00	
CARL E. HEUSSNER AWARD FUND:					
Fidelity Federal Savings and Loan Association, Glendale, California	3,000.00		3,000.00	3,000.00	
Total assets	$120,590.17	$80,096.76	$200,686.93	$200,490.80	$196.13
LIABILITIES AND PRINCIPAL					
CURRENT LIABILITIES:					
Accounts payable	$23.10	$6,138.92	$6,162.02	$7,071.68	$909.66*
Accounts receivable, credit balances		32.00	32.00	45.16	13.16*
Payroll tax deductions				929.43	929.43*
Foreign advances	19.30		19.30	23.57	4.27*
Excise tax				4.85	4.85*
Exchanges and advances	114.50		114.50	72.20	42.30
Accrued expenses	230.00	384.11	614.11	888.12	274.01*
Due to Research Fund	1,899.77		1,899.77	30.57	1,869.20
Total current liabilities	$2,286.67	$6,555.03	$8,841.70	$9,065.58	$223.88*
CARL E. HEUSSNER AWARD FUND	$3,277.89		$3,277.89	$3,200.21	$77.68
GENERAL FUND PRINCIPAL, Exhibit D	115,025.61	73,541.73	188,567.34	188,225.01	342.33
Total liabilities and principal	$120,590.17	$80,096.76	$200,686.93	$200,490.80	$196.13

Note: The above comparative balance sheet does not include inventories of publications, literature and supplies, office furniture and equipment.

COMPARATIVE STATEMENT OF INCOME • GENERAL FUND—"SOCIETY" CONTROL

EXHIBIT B — **For the years ended March 31, 1958 and 1957**

	Annual Budget 1957-1958	Year Ended March 31 1958	1957	Increase Decrease*
INCOME:				
Per Capita Tax and Dues (Pro rata share):				
Members	$18,000.00	$18,592.19	$17,763.33	$828.86
Members-at-large	1,900.00	779.92	1,903.91	1,123.99*
Sustaining members	1,000.00	837.00	920.70	83.70*
Publications, etc.:				
Technical "Proceedings"	2,500.00	2,845.80	3,610.35	764.55*
Books, other Society publications	3,000.00	3,295.94	4,232.83	936.89*
Branches:				
Membership insignia, etc., sold	200.00	347.59	198.45	149.14
Other Income:				
Interest on investments	4,750.00	5,151.00	4,771.00	380.00
Conventions			357.50	357.50*
Mailing services	2,600.00	3,033.91	1,271.84	1,762.07
Miscellaneous income		3.21	7.50	4.29*
Total income	$33,950.00	$34,886.56	$35,037.41	$150.85*
EXPENSES:				
Publications, etc.:				
Technical "Proceedings"	$15,500.00	$13,965.11	$18,665.32	$4,700.21*
Books, other Society publications	2,500.00	2,718.15	3,088.12	369.97*
Copyright expense		4.00	4.00	
Headquarters—Personnel (Pro rata share):				
Staff salaries	19,250.00	18,490.36	20,797.17	2,306.81*
Social security and hospitalization	500.00	500.25	470.15	30.10
Travel	2,000.00	1,899.52	1,421.26	478.26
Headquarters—Office (Pro rata share):				
Office expenses:				
Rent		1,200.00	1,150.00	50.00
Telephone and telegraph		1,341.60	782.20	559.40
Postage and express		1,857.56	807.89	1,049.67
Office supplies	5,833.34	444.66	415.79	28.87
Printing and stationery		687.90	612.07	75.83
Insurance		262.74	58.12	204.62
Legal and accounting		1,112.70	663.34	449.36
Miscellaneous general expense		242.26	407.07	164.81*
Library and historical		.83	16.25	15.42*
Cost of index			357.25	357.25*
Cost of mailing services	1,000.00	597.05	920.35	322.30*
Furniture and equipment	866.66	540.97	233.09	306.88
Furniture and equipment repairs		50.72	112.59	61.87*
Office alterations and repairs			250.05	250.05*
National Officers:				
Travel (pro rata share)	4,500.00	3,527.65	1,820.91	1,706.74
Supplies	100.00		78.50	78.50*
Public Relations:				
Public relations and Interim Meeting	6,625.00	5,258.21	4,963.01	295.20
Committee meeting expense	500.00	452.06	384.09	67.97
Branches:				
Supplies	900.00	50.32	71.40	21.08*
Miscellaneous Branch expense		.75	354.57	353.82*
Total expenses	$60,075.00	$55,205.37	$58,904.56	$3,699.19*
EXCESS OF EXPENSES OVER INCOME	$26,125.00	$20,318.81	$23,867.15	$3,548.34*

Note: The expenses reported do not take into full account the changes during the period in inventories of publications, literature and supplies, office furniture and equipment.

COMPARATIVE STATEMENT OF INCOME • GENERAL FUND—"PLATING" CONTROL

EXHIBIT C — **For the years ended March 31, 1958 and 1957**

	Annual Budget 1957-1958	Year Ended March 31 1958	1957	Increase Decrease*
INCOME:				
Advertising (except classified)		$171,712.15	$175,927.78	$4,215.63*
Less:				
Discounts allowed		$2,670.15	$2,742.44	$72.29*
Agency commissions		23,802.73	23,451.00	351.73
Total deductions		$26,472.88	$26,193.44	$279.44
Net	$164,800.00	$145,239.27	$149,734.34	$4,495.07*
Subscriptions:				
Members (pro rata share of per capita tax)	$13,500.00	$13,769.43	$13,151.95	$617.48
Members-at-large (pro rata share of dues)	600.00	259.94	637.72	377.78*
Sustaining members (pro rata share of dues)	700.00	620.00	682.00	62.00*
Non-members	6,800.00	6,384.72	6,819.76	435.04*
Total subscriptions	$21,600.00	$21,034.09	$21,291.43	$257.34*

EXHIBIT C (Continued)

	Annual Budget 1957-1958	Year Ended March 31 1958	1957	Increase Decrease*
Sales:				
Reprints	5,000.00	2,683.70	5,133.89	2,450.19*
Classified advertising	325.00	423.20	356.00	67.20
Miscellaneous		538.43	82.90	455.53
Total sales	$5,325.00	$3,645.33	$5,572.79	$1,927.46*
Total income	$191,725.00	$169,918.69	$176,598.56	$6,679.87*
EXPENSES:				
Monthly publication expense:				
Printing costs	$80,000.00	$69,691.23	$73,122.85	$3,431.62*
Other costs		4,777.55	5,194.52	416.97*
Headquarters—Personnel:				
Salaries	57,750.00	54,220.88	47,794.00	6,426.88
Social security and hospitalization (pro rata share)	1,500.00	1,289.83	946.68	343.15
Commissions:				
Advertising manager	2,850.00	1,714.24	1,690.38	23.86
Assistant advertising manager			502.13	502.13*
Travel	4,900.00	3,341.31	3,766.83	425.52*
Headquarters—Office (pro rata share):				
Office expenses:				
Rent		3,240.00	3,190.00	50.00
Telephone and telegraph		2,365.07	3,233.16	868.09*
Postage and express		1,334.86	1,429.40	94.54*
Office supplies		851.64	951.80	100.16*
Printing and stationery	11,666.66	866.02	1,245.92	379.90*
Insurance		543.44	83.15	460.29
Legal and accounting		781.69	718.08	63.61
Miscellaneous general expense		381.13	287.58	93.55
Furniture and equipment	433.34	691.30	608.97	82.33
Furniture and equipment repairs		101.45	236.49	135.04*
Office alterations and repairs			499.95	499.95*
National Officers:				
Travel (pro rata share)			1,725.27	1,725.27*
Promotional advertising and Audit Bureau of Circulations	3,000.00	2,478.53	1,408.35	1,070.18
Reprints	3,500.00	1,859.38	3,724.29	1,864.91*
Public relations			308.40	308.40*
Copyright expense		48.00	44.00	4.00
Total expenses	$165,600.00	$150,577.55	$152,712.20	$2,134.65*
EXCESS OF INCOME OVER EXPENSES	$26,125.00	$19,341.14	$23,886.36	$4,545.22*

Note: The expenses reported do not take into full account the changes during the period in inventories of publications, literature and supplies, office furniture and equipment.

EXHIBIT D — **STATEMENT OF GENERAL FUND PRINCIPAL**
For the year ended March 31, 1958

	"Society"	"Plating"	Total
BALANCE, APRIL 1, 1957	$134,024.42	$54,200.59	$188,225.01
Add:			
Excess of income over expenses for the year ended March 31, 1958, per Exhibit C		19,341.14	19,341.14
Income from convention	1,320.00		1,320.00
Total	$135,344.42	$73,541.73	$208,886.15
Deduct:			
Excess of expenses over income for the year ended March 31, 1958, per Exhibit B	20,318.81		20,318.81
BALANCE, MARCH 31, 1958	$115,025.61	$73,541.73	$188,567.34

EXHIBIT E — **COMPARATIVE BALANCE SHEET—RESEARCH FUND**
March 31, 1958 and 1957

ASSETS	March 31 1958	1957	Increase Decrease*
CURRENT ASSETS:			
Demand deposit	$27,032.95	$29,080.39	$2,047.44*
Time deposits	84,000.00	84,000.00	
Accounts receivable	5.45	37.14	31.69*
Due from General Fund, "Society" control	1,899.77	30.57	1,869.20
Total assets	$112,938.17	$113,148.10	$209.93*
LIABILITIES AND PRINCIPAL			
CURRENT LIABILITIES:			
Advance payments	$2,200.00		$2,200.00
Payroll deductions		77.52	77.52*
Due to General Fund, "Plating" control	285.68	230.00	55.68
Accrued expenses		35.46	35.46*
Total current liabilities	$2,485.68	$342.98	$2,142.70
RESEARCH FUND PRINCIPAL, Exhibit G	110,452.49	112,805.12	2,352.63*
Total liabilities and principal	$112,938.17	$113,148.10	$209.93*

COMPARATIVE STATEMENT OF INCOME—RESEARCH FUND

EXHIBIT F — **For the years ended March 31, 1958 and 1957**

	Annual Budget 1957-1958	Year Ended March 31 1958	1957	Increase Decrease*
INCOME:				
Sustaining membership dues and subscriptions (pro rata share)	$35,000.00	$29,443.00	$31,897.30	$2,454.30*
Per capita tax (pro rata share)	6,800.00	6,884.75	6,575.95	308.80
Member-at-large dues (pro rata share)	216.00	130.10	319.05	188.95*
Sale of reprints	600.00	554.02	223.14	330.88
Interest on investments	2,900.00	3,075.00	2,886.67	188.33
Branch contributions	200.00	600.00	200.00	400.00
Contribution by other society			500.00	500.00*
Miscellaneous income		6.50		6.50
Total income	$45,716.00	$40,693.37	$42,602.11	$1,908.74*
EXPENSES:				
Transfer to Canadian Research Fund	$4,000.00	$4,000.00	$3,999.13	$.87
Project payments to institutions	36,735.00	26,075.00	20,150.00	5,925.00
Project payments to directors and associates		7,820.74	7,934.52	113.78*
Reprint purchases	2,000.00	917.63	204.33	713.30
Social security tax	150.00	112.20	66.21	45.99
Traveling expenses	125.00			
Sustaining membership promotion and certificates	500.00	401.08	385.45	15.63
iscellaneous expense, including postage, printing and stationery	2,800.00	1,782.90	730.90	1,052.00
ffice expense	1,500.00	1,500.00	1,234.30	265.70
Legal and accounting	214.00	87.00	218.08	87.00
Contingency		157.45		60.63*
Exchange fees	192.00	192.00	86.82	105.18
Total expenses	$48,216.00	$43,046.00	$35,009.74	$8,036.26
EXCESS OF INCOME OVER EXPENSES			$7,592.37	$9,945.00*
EXCESS OF EXPENSES OVER INCOME	$2,500.00†	$2,352.63		

Note: †$2,500.00 to come from Research Fund Principal.

STATEMENT OF RESEARCH FUND PRINCIPAL

EXHIBIT G — **For the year ended March 31, 1958**

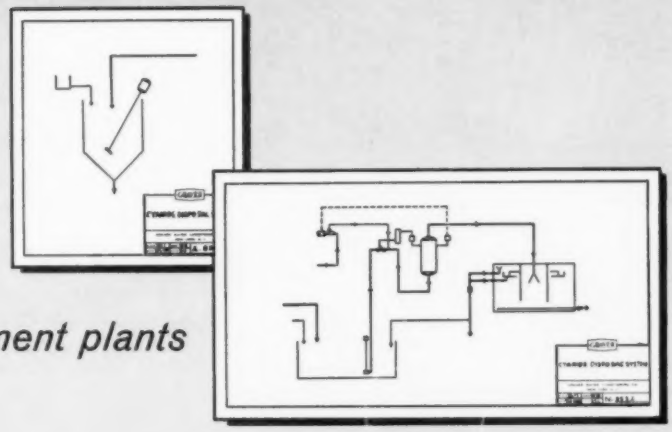
BALANCE, APRIL 1, 1957	$112,805.12
Deduct:	
Excess of expenses over income for the year ended March 31, 1958, per Exhibit F	2,352.63
BALANCE, MARCH 31, 1958	$110,452.49

COMPARATIVE STATEMENT OF RECEIPTS AND DISBURSEMENTS CANADIAN RESEARCH FUND

EXHIBIT H — **For the years ended March 31, 1958 and 1957**

	Year Ended March 31 1958	1957	Increase Decrease*
BALANCE, APRIL 1 (THE DOMINION BANK, TORONTO, CANADA)	$1,975.83	$1,988.55	$12.72*
RECEIPTS:			
American Electroplaters' Society, Research Fund	$4,000.00	$3,999.13	$.87
Branch contributions	180.00	100.00	80.00
Sustaining membership dues	2,100.00	1,900.00	200.00
Interest	22.63	17.14	5.49
Total receipts	$6,302.63	$6,016.27	$286.36
Total	$8,278.46	$8,004.82	$273.64
DISBURSEMENTS:			
Ontario Research Foundation	$6,000.00	$6,000.00	
Discount and exchange		28.99	28.99*
Total disbursements	$6,000.00	$6,028.99	$28.99*
BALANCE, MARCH 31 (THE DOMINION BANK, TORONTO, CANADA)	$2,278.46	$1,975.83	$302.63

from simple units...



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POSITIVE CYANIDE DISPOSAL

From simple batch units to continuous treatment plants, Graver Cyanide Disposal Systems are engineered to provide— ★ POSITIVE DISPOSAL

★ SAFETY

★ SIMPLICITY

★ MINIMUM MAINTENANCE

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Graver Systems include equipment for oxidation of cyanide to cyanate or complete cyanide destruction by either batch or continuous disposal.

The complete line of Graver equipment for the treatment of cyanide *and all other plating wastes* includes Reactivators®, Rota-Rake® Sedimentation Basins, Ion Exchangers, and specially designed batch treatment units with all controls and accessories.

Whether your problem is cyanide, chromate, acid, alkali or any combination of wastes, Graver know-how, based on years of successful waste treatment experience, will provide the perfect answer in the form of integrated, efficient systems job-engineered to individual plant needs.

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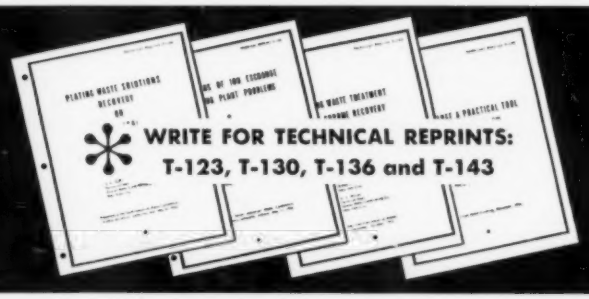


WRITE FOR TECHNICAL REPRINTS:
T-123, T-130, T-136 and T-143

INDUSTRY NEWS

CHROMIUM CORP. OCCUPIES NEW PLANT

Chromium Corp. of America has opened a new industrial chromium plating plant at 8701 Union Avenue, Cleveland, Ohio. The operation specializes in the plating with chromium of cylinder liners for diesel oil engines, primarily for the railroad systems, together with marine, pipe line, transport and other industries utilizing diesel power.

In addition to the plant at Cleveland, a similar liner plating department is operated at the corporation's Waterbury, Conn. plant.

Long a supplier to the railroads and to diesel engine manufacturers, the corporation applies chromium to cylinder bores. The processing includes all mechanical finishing.

The land site of the new plant is approximately 3 acres of prime industrial property, situated 4 miles from the terminal center of Cleveland. It is located between the main lines of the New York Central System and the Erie Railroad and has a private railroad siding. In addition, there are 2 access roads and winterized docks to accommodate trucks.

Mechanical equipment for machining, honing, polishing and blasting of liner bores, coupled with a direct-current electrica capacity of 110,000 amp at plating voltages from Crodon-plating, are designed specifically for engine components. Machine operations are in separate enclosures and deep pads to dampen vibration form the mounts for hones. Vaults separate the plating tanks from direct current power equipment in alternate banks arranged in-line. This sequence provides optimum efficiency in electrical transmission and controlled ventilation for each of the plating and power rooms. A hub pattern is followed in the production-flow sequence with inspection stations to accommodate each stage of productivity.

CARBORUNDUM OPENS NEW LABORATORY

The electro minerals division of The Carborundum Co. has opened a product development laboratory, according to Joseph S. Imirie, vice president and general manager of the division.

The division manufactures crude silicon carbide and aluminum oxide, abrasive grains and powders, tumbling nuggets, boron carbide, other carbides and oxides.

The new laboratory was built to meet the increasing demand for technical information, not only for the division's established products, but also for its new and improved product lines. The new facility contains a wide variety of laboratory equipment for product development and testing. It also provides pilot plant facilities for developing the manufacturing processes required for new products and the improvement of processes used in existing plants.

Techniques of abrasive crushing and sizing can be checked on a scale large enough to evaluate their effects on product quality in volume production operations.

The new facility is under the overall direction of J. J. Forrester Jr., manager, product engineering branch, with M. F. Kiachif, manager of the product development department, in direct charge.

MacDERMID ABSORBS SUBSIDIARY

MacDermid Western Incorporated, a wholly owned subsidiary of MacDermid Incorporated, Waterbury, Conn. manufacturer of metal cleaning, plating and finishing chemicals, has been absorbed by the parent company.

All business of the Ferndale, Mich. subsidiary will be taken over by MacDermid Incorporated. Purchase orders, billings, debits, credits, and all other business transactions will now be handled by the Waterbury office.

LOGO MERGED WITH BEE CHEMICAL

Logo, Inc., formerly a wholly owned subsidiary, has been dissolved and merged into its parent, the Bee Chemical Co. Increased emphasis on research and development in the fields of specialty coatings for plastics and vacuum metallizing is scheduled. M. A. Self, formerly president of both firms will serve as president and general manager. R. E. Dunning has been elected to the position of vice president of manufacturing.

DuPONT CHANGES DIVISION NAME

The specialty products sales section of Du Pont's Freon products division has been renamed the Fluoro solvents and chemicals section.

Freon solvents are being accepted widely in the cleaning of electrical and electronic equipment, printed circuits, instruments, precision equipment, oxygen systems, motion picture film, magnetic tape, and other applications where safety, stability, lack of residue, and selectivity are important.

HASLER RECEIVES BECKMAN AWARD

The fourth annual Beckman Award for outstanding contribution to the field of chemical instrumentation was presented to Dr. Maurice F. Hasler of Glendale, Calif., on April 14 at the 133rd national meeting of the American Chemical Society in San Francisco.

Administered by the ACS, the $1000 award is sponsored by Beckman Instruments, Inc. It is designed to honor pioneering achievement in the development of new instruments for chemical analysis or the application of analytical instrumentation to chemical process control.

Dr. Hasler, president and director of research for Applied Research Laboratories, Glendale, was selected for the Beckman Award as a result of his development of a direct-reading optical emission spectrometer which gives a complete chemical analysis of a metal in one minute.

A native of New York City, Dr. Hasler earned his BS in physics at California Institute of Technology in 1929. He continued his studies at Cal Tech to earn his masters and doctorate, also in physics.

Co-holder of four patents and author of a number of scientific papers on spectrochemical analysis, Dr. Hasler is a member of the American Chemical Society, the Optical Society of America, the American Society for Metals, and the American Society for Testing Materials.

AMERICAN CHEMICAL PAINT CHANGES NAME

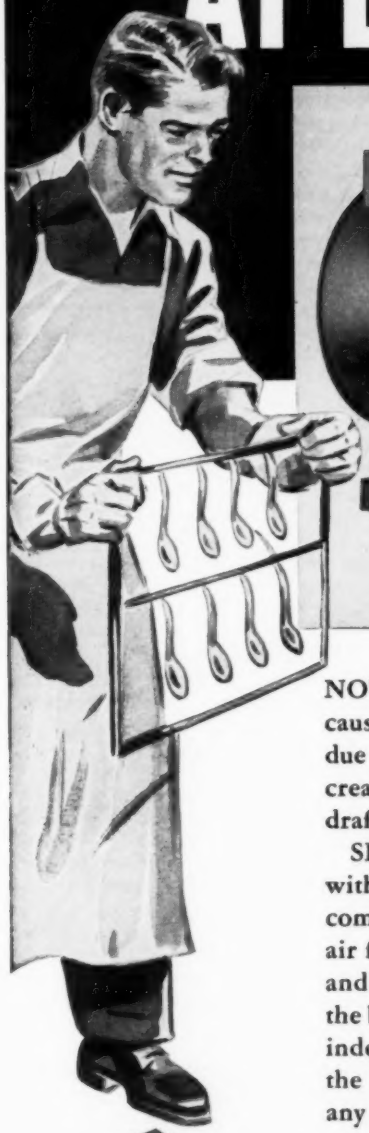
The American Chemical Paint Co. has changed its corporate name to Amchem Products, Inc. Officials of the company state that, since the company started 44 years ago, its activities have been expanded and its products diversified in the field of chemicals—whereas it no longer manufactures paint of any kind.

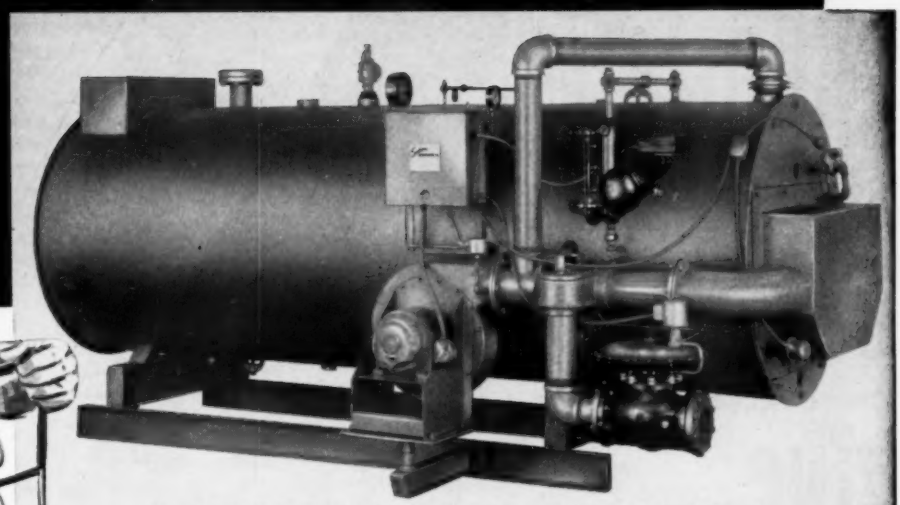
The change of name will not affect in any way the capital or corporate structure of the company. The personnel will remain the same.

IMPROVE MATERIALS HANDLING AT ALLIED CHEMICAL PLANT

A major modernization and improved materials handling equipment project is about to begin at the Baltimore Mutual chromium chemicals plant of Solvay Process division, Allied Chemical. According to I. H. Munro, Solvay Process presi-

AT LAST A BOILER DESIGNED FOR THE PLATER!





Model 105 Sellers Closed Combustion Chamber Boiler

NOW—No more foul fumes because of incomplete combustion due to back draft through boiler created by exhaust fans or poor draft conditions.

SELLERS solves this problem with the improved design, closed combustion chamber boiler. All air for combustion, both primary and secondary, is pushed through the boiler under positive pressure, independent of partial vacuum in the building and independent of any back draft on the chimney (of course, products of combustion must be removed from building).

A positive pressure blower supplies air under pressure which is mixed with the gas and passed to burners in the completely closed combustion chamber; to complete combustion, secondary air is fed into the closed chamber under positive pressure (many times greater than the vacuum in the building). By this method of securing positive complete combustion, burned gases are pushed through the boiler and FOUL FUMES ARE ELIMINATED.

Read about these Extra Features in Catalog 5206

1. NOW—SCHOOL ROOM QUIET
2. ALL-ON, ALL-OFF RUNNER PILOTS
3. NO OPEN FLAME
4. WORKS ON LOW GAS PRESSURE
5. POSITIVE PRESSURE BLOWER OVERCOMES BUILDING VACUUM AND CHIMNEY BACK DRAFT
6. SIZES FROM 15 HP TO 200 HP

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Blast Heaters • Immersion Automatic Water Heaters • Combustion Units • Industrial Gas Burners
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These are not just spotty identification colors. These are scintillating golds, yellows, blues, greens, violets, reds, brass and copper hues that will add glamor and sales appeal.

Especially Brilliant on Wire Goods

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THE *Chemical* CORPORATION
57 Waltham Ave., Springfield 9, Mass.

dent, the project will include alteration of an existing building to a modern warehouse facility for more efficient storage and handling of chromium products; construction of a new truck dock; and installation of new materials handling equipment.

Partially designed by Solvay engineers, the new materials handling equipment will result in rapid product packaging. Completely automatic, the machines will remove covers from drums, fill each container with an exact weight of chemicals, and then replace the cover. Automatic weight check and labeling follow.

A modern ventilation system will be installed with the automatic packing equipment.

The new truck dock will facilitate deliveries of materials to and from the plant, resulting in savings of time to both the trucker and the Solvay plant.

Chromium chemicals produced at the Solvay plant find a wide variety of applications. Products manufactured at the Baltimore plant include the Mutual line of sodium bichromate, sodium chromate, potassium bichromate, potassium chromate, ammonium bichromate, chromic acid, and chromic sulfate.

WAGNER ADOPTS NEW SHIPPING CONTAINERS

Wagner Brothers Inc., Detroit, recently adopted a new system of shipping corrosive liquid additives which will provide users of its products several in-plant advantages, and freight savings as high as 50 per cent.

The new system, which centers around easy-to-handle, 5-gal plastic bottles substituted for large glass and plastic carboys, eliminates both extra-space freight charges and clerical costs in connection with deposits and rehandling schedules in returning containers. It also provides added safety in dispensing, and more flexibility in making additives to metal plating baths.

The new polyethylene bottles, the company says, allow more gallonage (240 gal) to be shipped in the same 96-gal skid area of the carboys. They enable additives to be stored near the usage area, and dispensed without transferring to other containers. Another advantage is freedom from losses due to breakage either in the plant, or from freezing while in transit during cold weather.

COATED ABRASIVE MACHINE SHOW

Fifty-three manufacturers of coated abrasive machine tools will demonstrate their new products in the Third National Coated Abrasives Machinery Show June 10-13 at Troy, N. Y. This year's show will take place in the new $1,000,000 Product Engineering building of Behr-Manning Co., a division of Norton Co., which sponsors the event for the American manufacturer who seeks to increase production, improve quality or cut cost.

Unlike the 1954 event at Chicago or the 1956 show at Cleveland, this year's will include woodworking as well as metalworking machinery. As in the past, industrial production men will be invited to bring actual workpieces and test grind them on various machines, comparing machine speeds and pressures, abrasive grits, bonds and backings, contact wheel densities, lubricants and other variables. All machines will be in full operation.

Among new machinery developed since the 1956 show is a giant grinder designed for mechanical descaling and heavy stock removal, using a coated abrasive belt 50 in. wide driven by a 150 hp motor; a 40-ft longitudinal polisher for tube, bar and extruded sections; and a centerless grinder with fully automatic gauging. Machines will range in size from sheet polishers and big automatic equipment to portable air-driven tools for offhand work.

Construction of an entire new building for the company's Product Engineering department reflects the growing importance of the coated abrasive belt, disc and other forms in the metal, wood, plastics, glass and other industries. It also is expected to stimulate new contributions to industry by the firm's staff of product engineers. This department is responsible for the sales engineering job, promoting new applications of coated abrasives and assisting in the development of grinding and polishing machines.

The new building includes advanced features. It has a belt storage room with constant control of temperature and humidity which may serve as a standard for industry. It has also the most modern and complete of sub-floor filtering units, fully automatic and designed to help maintain consistent low micro-inch tolerances.

KELITE OBTAINS INJUNCTION AGAINST KHEM

As a result of an action brought by the Kelite Corp. in the Federal District Court for the Northern District of Illinois, Judge Win G. Knoch of that Court has recently held that defendant, Khem Chemicals, Inc., of Chicago, Ill., which is operated by a group of former Kelite employes (who were also named as defendants in this case) had unlawfully misappropriated and used twenty-two Kelite secret formulas as well as secret customer information. In addition, the Court ruled valid Kelite's Patent No. 2,381,124 and held that it had been infringed by defendant, Khem.

On March 5, 1958, the Court issued injunctions against Khem and the individual defendants, restraining them from future patent infringement and use of the trade secrets as well as prohibiting them from future efforts to sell products of the type involved in the lawsuit to a large group of Kelite customers and former customers.

INDUSTRY NEWS BRIEFS

WIDER APPLICATION PREDICTED FOR CHEMICAL MILLING

Chemical milling, used in the California airplane parts industry, will have extensive applications in many other California manufacturing fields, according to a survey of 47 parts manufacturing companies in the Los Angeles area. The survey by Union Factors Co., entitled "New Methods in California Airplane Parts Manufacturing," finds that chemical milling will spread to other California industries: manufacture of metal advertising signs, tools, and dies, office equipment, automotive parts, electric fixtures for homes, stainless steel equipment for restaurants, etc.

Chemical milling is now beginning to be used on aluminum, magnesium, titanium, steel, stainless steel, inconel, monel, steel super-alloys, carbon steels.

The major use of the new chemical process in the airplane parts industry, as brought out by the Union Factors survey, is to cut the weight and improve the strength of airplane parts as a means of increasing the range and speed of the finished plane.

For one jet plane, chemical milling was used in making 230 parts. The estimated weight saving of the parts and of the lesser fuel needed to carry a lighter plane was 930 pounds.

Advantages are:

1. Chemicals reach areas that a machine tool cannot, permitting removal of metal and shaping of recesses to very close tolerances.
2. A metal's hardness is not a factor as it is in machining.
3. Equipment and tooling costs compare very favorably with those for machine setup, and from one to 1000 parts can be chemically milled at the same time, whereas often in machine milling only one part at a time can be produced.

STAUFFER CHEMICAL PLANS $14-MILLION EXPANSION THIS YEAR

Showing confidence in the future of the nation's economy, Stauffer Chemical Co. plans to invest about $14,000,000 this year in new plants, capital improvements and replacements—approximately the same level as in 1957. Stauffer is continuing its emphasis on research which last year represented a record investment of $3,490,000, up 24 per cent over 1956.

TRANSLATION SERVICE INITIATED BY SPECIAL LIBRARIES ASSOCIATION

The Special Libraries Association Translation Center, located at the John Crerar Library in Chicago, has announced that it can now furnish, on a subscription basis, printed catalog cards for current scientific and technical material which has been translated into English from all languages, including Russian.

Information about the SLA Translation Center and its services may be obtained from: The SLA Translation Center, The John Crerar Library, 86 East Randolph Street, Chicago 1, Illinois.

COPPER SULFATE IN FEBRUARY 1958

Production and shipments of copper sulfate in the United States in February were each 26 per cent less than in January. Shipments were 700 tons less than production, and stocks rose 16 per cent. Inventories were sufficient for more than a month's needs at the February rate of shipments. Imports of copper sulfate in January were 25 tons, all from Canada, and exports were 193 tons.

CADMIUM SUPPLY IN 1957

Supply of cadmium in the United States in 1957 was 10 per cent above demand for the metal. Cadmium metal production and cadmium metal imported for consumption provided a total domestic supply of 12.13 million lb, nearly 12 per cent below 1956. Demand, as measured by apparent consumption, was 11 million lb, 13 per cent under 1956.

Barrel Nickel Plating Troubles

●

There are two very prevalent troubles in barrel nickel plating. One of these is flaking or peeling of nickel from nickel. This is a function of the nickel solution, operation or equipment and the cure lies in this spot. Peeling of the nickel from the base metal is also common. Most of this trouble can correctly be blamed on the cleaning. Incorrectly it is too often blamed on the alkali cleaner. With the advances in modern cleaning these are quite foolproof. The entire cleaning cycle must be considered. Contaminated rinses are usually obvious but should be checked. Inadequate rinsing can cause trouble. In cold weather the cold rinse water can cause trouble with rinsing.

●

A potent source of trouble is in the acid dips. Since this is a final treatment before the plating it must be clean. Contamination by copper from brass parts can cause trouble when steel parts are run through later. Drag in of cleaners and other dirt by inadequate rinsing can cause poor adhesion. A more insidious trouble is caused by many of the so-called improved acid materials. These materials are dry acid salts usually with an inhibitor added. They are very weak in acid action so must be operated at high concentrations. All inhibitors act by forming films on the surface. Most of these films are detrimental to subsequent plating unless removed. Also the high cost of these results in recommended lengths of use which allow the buildup of harmful amounts of dirt. There are also other valid reasons for not using these materials in plating cycles as the final acid dip.

●

Normally the final acid dip is best made from standard hydrochloric or sulfuric acid. Where the work has no rust or scale and has a high finish the dip may be as weak as 3 to 5 per cent by volume which retains the high finish. Stronger concentrations will remove rust, scale and other films in scheduled times. Variations in concentrations may be made as necessary. The low cost enables discarding of the acid solution at fairly frequent intervals so that buildup of impurities is eliminated.

●

True Brite Nickel Brightener is a logical choice for your barrel nickel solution. In spite of imitations we can still offer performance as you want it with costs as low as any and the trouble free operation you can depend on. We have more experience in barrel nickel plating than any other supplier and have the complete materials and service you need.

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PATENT ABSTRACTS

DR. D. GARDNER FOULKE
Manager, Electrochemical Development
Hanson-Van Winkle-Munning Co
Matawan, New Jersey

Copies of patents may be obtained by writing to Commissioner of Patents, Washington, D. C. Price 25 cents each.

No. 2,817,610, December 24, 1957—Black Oxide Coatings on Steel—I. Newell, Wethersfield, Conn., and E. Walen, Longmeadow, Mass.

The composition consists essentially of alkali metal hydroxide 50–90 parts by weight, alkali metal nitrate 0.1 to 50 parts by weight together with 0.1 to 25 parts by weight of at least one compound chosen from soluble alkali metal thiocyanate, thiourea and alkyl thioureas.

12 claims.

No. 2,822,289, February 4, 1958—Silvering Surfaces—E. Millard, assignor to Olin Mathieson Chemical Corp., Baltimore, Md.

Silver can be deposited as an adherent film by spraying onto a surface two solutions. One contains silver nitrate, the other 1 to 2 per cent of B-hydroxyethylhydrazine.

4 claims.

No. 2,822,292, February 4, 1958—Metal Deposition—H. Schladitz, Munich, Germany.

A uniform, firmly adherent coating can be deposited by heating a heat decomposable material to a temperature above its decomposition temperature under pressure, then releasing as a jet which permits deposition.

9 claims.

No. 2,822,293, February 4, 1958—Chemical Nickel Plating—G. Gutzeit, et al., assignors to General American Transportation Corp., Chicago, Ill.

An electroless nickel solution in which the hypophosphite ions expressed in mole/l is within the range 0.15–1.20 and the ratio between nickel and hypophosphite is between 0.25 and 1.60 is described.

See also No. 2,822,294, assigned to General American with 8 claims.

7 claims, figure.

No. 2,822,325, February 4, 1958—Tinning—E. Tinnon and I. Simmons, assignors to Metal and Thermit Corp., New York, N. Y.

A dry tinning and cleaning composition to be dissolved in water contains:

3–8 g	KOH
60–120 g	K_2SnO_3
0–10 g	K_2CO_3
50–100 g	Versene
30–60 g	Na_3PO_4
0.5–1 g	$C_{12}H_{25}OSO_3Na$

6 claims.

No. 2,822,326, February 4, 1958—Chromium Alloy Plating—W. Safranek, assignor to Rockwell Spring and Axle Co., Coraopolis, Pa.

A bright chromium alloy deposit is claimed to be deposited from a bath containing 30–75 g/l Cr^{+++}, 10–50 g/l alkali metal ions and ions of iron (0.6–2.5 g/l) nickel (0.1–1 g/l) or cobalt (0.1–1.0 g/l) and a brightening agent selected from

	g/l
Urea	0.1–188
Methyl pyridium chloride	0.1–10
Diamino pyridine	0.1–10
Formamide	0.1–10
Dimethylthiourea	0.1–10
Histidine monohydrochloride	0.1–10
Sulfonated saccharin	0.1–10

16 claims.

No. 2,823,150, February 11, 1958—Descaling Metals—J. Hendricks, assignor to Dever Corp., Cleveland, Ohio.

To descale ferrous metals hold in a bath of fused sodium hydroxide activated by 1–5 per cent elemental sulfur, quench in water and pickle in an acid bath.

6 claims.

No. 2,823,176, February 11, 1958—Antimony Plating—E. Breining, C. Nixon and W. Vincent, assignors to General Motors Corp., Detroit, Mich.

The bath contains 20–300 g/l of antimony, a metallic cation other than antimony in a small amount to provide a smooth, adherent deposit and an addition agent, catechol (20–300 g/l).

8 claims.

No. 2,823,180, February 11, 1958—Method for Coating Wires—E. Rothschild, Secaucus, N. J.

A machine for electroplating wires or strip is described.

3 claims, 7 figures.

No. 2,823,184, February 11, 1958—Metal Pickling—R. Plump and J. Carroll, assignors to Pennsalt Corp., Pa.

Add to a non-oxidizing acid 0.091 to 7 per cent of the condensation product of acidified sulfite pulp waste liquor, water soluble aldehyde, urea and thiourea.

15 claims.

No. 2,824,020, February 18, 1958—Coating Metal Strip—N. Cook and S. Norteman, assignors to Wheeling Steel Corp., Wheeling, W. Va.

A method of flux coating metal strip before immersing the strip in molten metal to be deposited on strip when strip is moving in a vertical fashion.

See also No. 2,824,021, assigned to Wheeling Steel with 2 claims.

10 claims, figure.

No. 2,824,052, February 18, 1958—Finely Divided Iron—F. Czech, assignor to Diamond Alkali Co., Cleveland, Ohio.

Electrolyze a soluble iron salt suspended in an alkali metal hydroxide electrolyte.

7 claims.

No. 2,824,053, February 18, 1958—Ductile Chromium—E. Wainter, assignor to Horizons Titanium Corp., Princeton, N. J.

Ductile chromium is prepared by electrolyzing a fused salt bath under an inert atmosphere.

3 claims.

No. 2,824,365, February 25, 1958—Soldering Aluminum—G. Erickson, assignor to U.S.A. (A.E.C.).

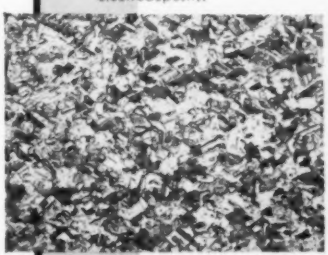
Heat the aluminum to 30C, rub gallium on the surface, heat to 180–200C and apply lead-tin solder to the area.

5 claims.

NEW SHAPED, EXTRUDED APW SILVER ANODES

STANDARD SHAPES

ROLLED FLAT PLATE ANODE SECTION:
This Photomicrograph shows highly irregular, uncontrolled grain size—a major cause of shedding and resultant rough electrodeposits.



APW EXTRUDED ANODE SECTION:
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These scientifically shaped anodes retain 80% of original active surface area after 85% by weight has been plated off!

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In addition, the APW Extrusion Process controls grain size within definite ideal limits so that corrosion is smooth and uniform. Electrodeposits are *consistently* smooth. Shedding is virtually eliminated. Rejects are a comparative rarity!

We are anxious that the silver you buy in anodes is used most efficiently and economically. Special anode shapes will be engineered to meet your particular plating bath conditions. Call or write for a representative. We'll be glad to assist with your plating problems.

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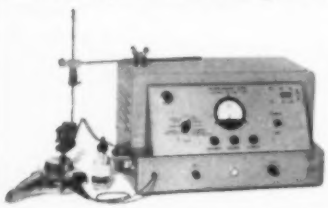
KOCOUR ELECTRONIC THICKNESS TESTER, Model 955, for determining the thickness of plating.



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No. 2,824,526, February 25, 1958—Adherence Treatment of Metal Surfaces—T. Nohijl, assignor to National Aluminate Corp., Chicago, Ill.

To improve the co-efficient of friction between car wheels and tracks apply to at least one of the contacting surfaces a thin coating of a water-insoluble metal carbonate.

35 claims.

No. 2,824,819, February 25, 1958—Oxide Insulating Aluminum Conductors—M. Smith, Westport, Conn.

A method is described for maintaining the insulating film on anodized aluminum coil stock (for inductance coils) by coiling at the end in an atmosphere of nascent oxygen, ozone or ultraviolet radiation.

6 claims, 3 figures.

No. 2,824,828, February 25, 1958—Colored Glass Fibers—H. Homer and J. Whitacre, assignors to The Commonwealth Engineering Co., Dayton, Ohio.

A heat-decomposable aluminum salt ($Al(R)_3$ where R is a lower aryl or aliphatic radical) is brought into contact with heated glass fibers under vacuum to deposit aluminum which is then anodized and dyed.

3 claims.

No. 2,824,829, February 25, 1958—Black Chromium-Vanadium Coatings—M. Quaely, assignor to Westinghouse Electric Corp., E. Pittsburgh, Pa.

Electrolyze in a bath containing 150 to 385 g/l of chromic acid, 1.8 to 10 g/l of vanadium in soluble form, and 3 to 20 g/l of a water soluble carboxylic acid.

4 claims.

No. 2,824,830, February 25, 1958—Electroplating—J. Hausner, Chicago, Ill.

Claim 1 is as follows: "A process for electroplating with an electrolyte which comprises immersing an electrode and an article to be plated in the electrolyte, connecting the electrode and the article to a direct current source through a pair of conductors, connecting to said conductors an alternating current source having a frequency such that said conductors form a transmission line of substantial electrical length as compared to one wave length, determining the resonant and anti-resonant positions of said conductors by moving the high frequency connection points along said conductors, and obtaining a maximum high frequency field in the electrolyte by adjusting the high frequency connection points to resonant positions.

6 claims, figure.

No. 2,825,658, March 4, 1958—Chromizing—G. Samuel, assignor to Metal Diffusions, Inc., Philadelphia, Pa.

Steel of 0.35 carbon content or less may be treated with exclusion of air in a box-like container containing finely divided chromium and 0.06 to 0.26 per cent of weight of chromium of ammonium bromide at 1650 to 1950F for three hours.

4 claims.

No. 2,825,681, March 4, 1958—Electroplating—S. Johnston, assignor to National Steel Corp., Delaware.

To eliminate striation and anode pattern on electrotinned strip, it is claimed the strip should be washed with relatively cold water, rinsed at 120–160F then tin plated. The rinse and plating bath must contain one tin electrolyte.

3 claims, 2 figures.

No. 2,825,682, March 4, 1958—Coating Titanium Surfaces—L. Missel and J. Powell, assignors to Menasco Mfg. Co., Burbank, Calif.

Titanium alloys containing about 5 per cent chromium and

about 3 per cent aluminum can be coated in an aqueous solution of 0.01 to 15 per cent hydrofluoric acid, 1 per cent to saturation of an alkali metal salt of chromic acid and from 0.01 per cent to saturation of a soluble salt of a heavy metal (Cu, Zn, Ag, Cd, Ni).

10 claims.

No. 2,825,683, March 4, 1958—Tin-Antimony Plating—F. Lowenheim and H. Forman, assignors to Metal and Thermit Corp., New York, N. Y.

A tin-antimony plate (0.2 to 1 per cent Sb and resistant to transformation of the tin) can be deposited from a bath containing 0.25 to 0.5 mole/l of sodium stannate, about 0.2 to 0.6 mole/l of free sodium hydroxide and an amount of sodium pyroantimonate to saturate the solution. The bath is operated at about 60C to boiling and the current density is 5 to 30 asf.

2 claims.

No. 2,826,288, March 11, 1958—Work Processing Machine—A Giarer, assignor to George L. Nankervis Co., Detroit, Michigan.

A conveyor for multi-stage processing of work pieces by the pusher method is described.

12 claims, figure.

No. 2,826,292, March 11, 1958—Transfer Mechanism—P. Arnold, assignor to Hanson-Van Winkle-Munning Co., Matawan, N. J.

A transfer mechanism designed to permit the exchange of a carrier from one conveyor to another is described.

7 claims, figure.

No. 2,826,517, March 11, 1958—Phosphatizing Steel—D. Miller, assignor to Kelite Products, Inc., Los Angeles, Calif.

A process for phosphating metals involves contacting the metal with a zinc, free phosphoric acid, sodium acid pyrophosphate containing solution.

To start the Zn: H_3PO_4 ratio being in the proportions of 1 part ZnD to 3 to 4.7 parts of H_3PO_4.

15 claims.

No. 2,826,538, March 11, 1958—Metal Blackening Process—J. Hunter and L. Kosowsky, assignors to Columbia Broadcasting System, Inc., Danvers, Conn.

A method of blackening aperture marks for color television picture tubes consists of chromium plating then anodically treating, cyclically plating and oxidizing until the mask becomes blackened.

4 claims, figure.

No. 2,826,540, March 11, 1958—Apparatus for Electrolytic Cutting, Shaping, and Grinding—George Keeleric, Evanston, Ill.

Claim 1 states: "Apparatus for combined electrolytic and abrasive shaping of an electrically conductive workpiece including in combination, a rotatable electrode having a working face made of an electrically conductive material, means connected to said electrode for rotating the latter, means for flowing a conductive electrolyte over said working face, electrically insulating spacing means consisting of particles of insulating abrasive material fixed to and projecting from said working face only a very short distance to determine the spacing distance between said electrode and the workpiece, said abrasive insulating spacing means having open spaces between the particles thereof to leave uninsulated portions of said working face exposed toward the workpiece and providing means to entrain and carry fresh electrolyte into the work space adjacent the workpiece and means for passing between said working face and the workpiece a high density, low voltage current in a sense to make said working face a cathode, whereby material may be removed from the workpiece by a combination of electrolytic attack and concurrent abrasion of the workpiece.

18 claims.

—and NO BUFFING . . . I understand that Livonia is doing the same."

"That's for sure, Jack . . . for the past two years Hank's been using our Rolled 2" Round Phosphor-Brite Copper at the Fort Street Plant and these startling results were obtained . . .

- No "Bagging"— No Diaphragms
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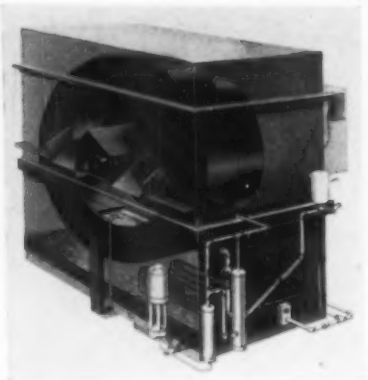


E—600. Automated Degreaser—Efficiency and economy in metal cleaning by combining solvent degreasing with automated work handling is claimed by Detrex's new model 1DD750.

It provides cleaning of such products as nuts, bolts, fasteners, stampings and screw machine parts. In-process cleaning, cleaning before heat treatment, cleaning before plating, phosphatizing, bright dipping, final cleaning — are handled with savings in initial investment, operating costs and space requirements.

Steam heated and measuring only 6′6″ wide and 6′0″ high, and 4′0″ in direction of work flow, the 1DD750 is compact.

E—601. Grain Refiner—The Conversion Chemical Corp. announces a new leveling and grain refining agent for cadmium plating solutions producing semi-bright deposists, Kenvert No. 25.

This agent has been designed to modify the grain structure of cadmium plate to guarantee uniform results with chromate conversion coatings. It is claimed to guarantee bright uniform results with dilute one-dip treatments and eliminate cloudy effects associated with this bright dipping.

Kenvert No. 25 is said to improve the throwing power of the bath and reduce burning and is an all organic agent.

E—602. Hand Cleaner—Introduction of a new compound for removal of paint, lacquer, adhesives, and other resinous products from the hands has just been announced by the Mark Kevin Co. Mar-Kev hand cleaning compound thoroughly dissolves away pigmented and resinous substances, and at the same time protects the skin by reason of its lanolin content, it is reported.

E—603. Burnishing Compounds—Time Chemical Corp. announces the introduction of two new burnishing compounds.

Time No. 559 is said to produce good leveling and brightness on a wide variety of metals and electroplated parts including steel, stainless steel, brass, brass plate, tin plate, nickel and silver after burnishing with steel balls or stones.

No. 525 can be used on the metals mentioned above as well as zinc die cast and aluminum.

It is claimed that these compounds are based on an entirely new concept of formulation with emphasis on good lubrication and producing bright, clean, filmless surfaces ready for subsequent finishing operations, such as lacquering or plating.

E—604. Polyethylene Dispenser—A new dispenser for adding and metering addition agents to a plating bath is announced by Wagner Brothers Inc. It is constructed so it can be mounted at any spot on the reinforcing angle rim of a plating tank, supported from any suitable position over the tanks by a hook, or remotely mounted with extra long tubing.

The dispenser consists of a 2 gal polyethylene container supported in an inverted vertical position by a plasticol coated ring stand.

The unit is calibrated in pints, and its rate of additive volume to the bath is controlled by an adjustable type pinch clamp around the plastic tubing.

E—605. Stainless Steel Filter—Made with a one-piece drawn shell of stainless steel, this new SSB10 Fulflo filter introduced by Commercial Filters Corp., resists chemical attack and oxidation. It provides micro-clarity of liquids and gases at operating pressures up to 150 psi. Flow rate is 2½-5 gpm for liquids of aqueous viscosity. Two pipe sizes—⅜ and ¾ in. Air vent and drain plug are included.

Filter employs honeycomb filter tubes in a variety of synthetic fibres to resist solutions chemically hostile to cotton. Nylon, orlon, dacron, dynel, acetate and glass fibres are available. Tubes are manufactured in a wide range of controlled densities.

E—606. Painting Machine—A new painting machine, model 4800, has been developed by Finish Engineering Co. Inc.

The guns spray down, and the exhaust is down—allowing coverage of outside edges to avoid overspray in the operator's face. Since the guns tilt during spraying, ends of shaped objects can be painted at the same stroke that paints the top and sides.

Particularly suited to painting large parts, the gun stroke is adjustable to permit efficient spraying of smaller pieces.

The part is held firmly in the mask during spraying, by a pressure pad actuated by an air cylinder. This prevents overspray on unwanted areas. Reciprocating action of the guns is by chain drive, powered by a hydraulic unit.

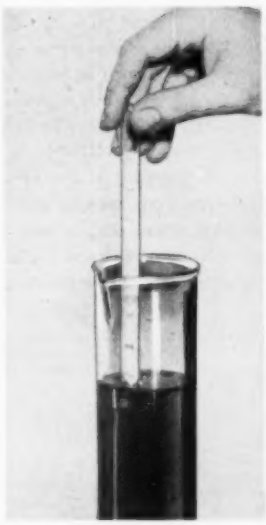
E—607. Barrel Finishing Machine—A barrel finishing machine designed for processing small and medium lots of parts and equipped with a built-in media separating system, has been announced by Almco, Queen Products, Inc. The new Model DBO-2A features a twin compartment, 5.6 cu ft neoprenelined barrel and built-in screening drawers to handle discharged loads from each compartment.

Its built-in separating system is said to eliminate the need for accessory media

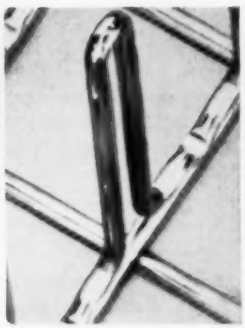
separator equipment, and the two-barrel-in-one feature allows simultaneous deburring and finishing of different types of work parts in one machine. A barrel speed range from 8 to 38 rpm also adds to the ability of the unit to perform all types of finishing operations requiring close tolerance specifications, it is reported.

E—608. Rinse Hoppers—Rinsing, chromating and bright dip finishing are automatically controlled in new air-operated rinse hoppers announced by Belke Manufacturing Co.

Plants see quality go up, costs down in chromium plating



Ordinary chromium failed to cover base.



SRHS Chromium covers bottom without burning top, for quality plate.

Control consists merely of quick solution-density reading. Simply adding SRHS Compound restores plating balance, maintains it, assures optimum results.

Improving quality of plating need *not* be accompanied by increasing costs. This has been demonstrated time and again at plants where a Unichrome SRHS® Chromium Solution replaced ordinary chromium. Fact is, the change usually results in a *saving*. Here's why:

CONTRIBUTIONS TO QUALITY

Presuming work has been properly undercoated, quality chromium can be recognized when work emerges from the tank bright, with complete coverage, free from grey or rainbow plate, and free from burns.

Obviously, such quality saves because it minimizes rejects and costly reruns. "SRHS" does this kind of work. With its wider bright plate range, it cuts down misplates. It covers even difficult parts well. Coverage and brightness on stainless steel are exceptional.

OTHER CONTRIBUTIONS TO SAVINGS

Unichrome SRHS Chromium has substantially improved operations. The baths self-regulate important chemical constituents. Automatically maintaining optimum plating balance, they save many hours of chemical analyses and control. Through higher cathode efficiencies, SRHS Chromium reduces power needs. Similarly, it increases tank load size as well as plating speed, thereby delivering more work from existing equipment.

1957 will see a repeat performance of these benefits in many hundreds of plants. Bulletin SRHS-3, available from Metal & Thermit, gives more details.

Copper-tin process simplifies bronze plating

Golden glow M&T Bronze Plating is as easy as depositing a single metal. No dual circuits are used, no "balky" anodes. Copper comes from conventional copper anodes, tin from the stable potassium stannate solution. The deposits build up as a homogeneous alloy.

The result is an extraordinary *golden-glow* bronze finish the image of 24 K gold. It makes an outstanding final finish; or a superior corrosion-resistant undercoat to replace copper and save on nickel. Send for data.

TANTALUM PROTECTS NEW ELECTRIC IMMERSION HEATER

A tantalum sheath encases the heating element in an electric immersion heater developed by Metal & Thermit. This is truly advanced design. It permits direct application of electric heat in all acid solutions except hydrofluoric and fuming sulfuric. This 5000-watt heater is rugged enough for long, continuous primary service.

Tantalum is an acidproof metal comparable to steel in strength. It is available also in Unichrome U-bend and "hair-pin"-bend coils . . . which can be used for both heating and cooling, outlast ordinary coils many times over, cut downtime and costs. Send for more information.

Unichrome is a trademark of Metal & Thermit Corp.

METAL & THERMIT
CORPORATION

General Offices: Rahway, New Jersey
Pittsburgh • Atlanta • Detroit
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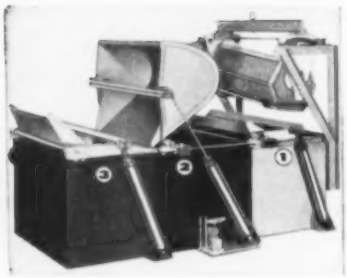
In Canada: Metal & Thermit—United Chromium of Canada, Limited, Rexdale, Ont.



The unit has three perforated hoppers, each independently operated by air cylinders on both sides of the tank.

Hopper No. 2 has automatic timing for accurate control of emersion time. No. 1 compartment and hopper are plain steel. The other two compartments are Tygon lined and Tygon coated, with hoppers of 3/16 in. stainless steel.

E—609. Brush with Sealed Shunt—Developed to defeat the long-standing problem of shunt corrosion by splashes from corrosive electrolytic baths, Ohio Carbon's new brush is said to provide protection for the shunt. Special insulation has been applied, extending from terminal to brush and sealed at both ends.

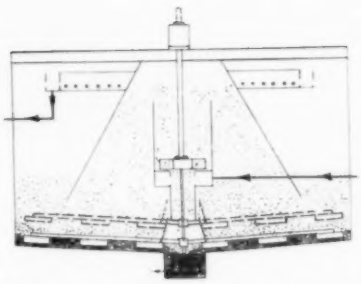
The new shunt protection is a seamless tube of flexible and insular material, sealed at brush and terminal so as to protect the copper shunt. It is presently being applied to the company's Grade MI brush.

E—610. Silicon Rectifier—Optional mounting bases and reverse polarity types in all ratings and mounting styles are design features of the expanded line of hermetically sealed, all-welded silicon power rectifiers for all industrial applications, now in production at International Rectifier Corp.

This series, rated at 45 to 150 amp (half-wave) with PIV voltage ratings from 50 to 800 v (pipe-thread, long machine thread and standard machine thread) offers reverse polarity types in each rating and mounting style.

Also available are military types conforming to MIL-T-12679/26 (Sig. C.). Long-term reliability under exterme conditions of environment, such as humidity and moisture, shock, vibration, centrifuging and temperature cycling, may be expected, according to the company.

Applications for these rectifier types include battery chargers, welding equipment, plating equipment, etc., as well as all types of military equipment. They may be operated at base temperatures up to +200 C.

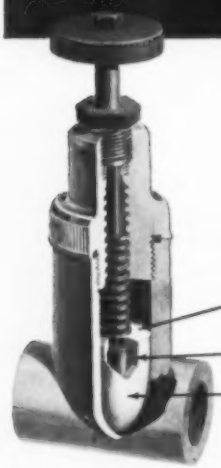


E—611. Hydraulic Lifter—An overload control for slurry clarifiers has been designed and patented by Graver Water Conditioning Co. It is available for use with the Graver Reactivator, a water clarification and softening unit.

The overload control is a hydraulic lifter on the sludge scraper shaft of the reactivator which goes into action when heavy sludge prevents normal rotation of the scrapers. The lifter raises the scrapers to as high as 12 in. or more—depending on the volume of sludge—so they can remove the top layer of sludge and work down until the entire bottom area has been cleared and the scrapers can operate smoothly in their normal position.

An hydraulic pump and valve system activates Graver's hydraulic lifter. The pump can be operated either manually or by a motor. The motor may be initiated either automatically or manually by a switch.

NEW! ALL-PLASTIC GATE VALVE



VANTON FLEX-PLUG* VALVE

½"-2" sizes

- No-pressure-drop construction of gate valve
- Throttling flow-control feature of globe valve
- PVC or styrene-copolymer construction
- Handles wide range of corrosives and slurries

- Back-seating feature of cap: when valve completely open, relieves pressure on packing.
- Free-to-swivel plug: provides even wear of cap, perfect closure.
- Flexible synthetic cap: easily replaced without removal of valve from line; minimal maintenance. Handles abrasive slurries without wear.

- All-plastic design — PVC or styrene-copolymer. Replaceable caps available in Neoprene, Buna-N, and Hypalon (Kel-F elastomer on special order).
- Suitable for vacuum — resilient cap makes excellent seal.
- Adaptable to all existing plastic pipe and fittings; especially suited to Vanton P, S, and N lines of plastic pipe and fittings.
- Rated for 150-lb. service—PVC line up to 140°F., styrene-copolymer line to 170°F.

*Pat. Pending

Catalog FP-1 gives full details. Write for it today!

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DIVISION OF COOPER ALLOY CORP.

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Indicator AND control-colors on SAME strip. Control-colors in steps of 0.2 pH and 0.3 pH.

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(200 strips of a range per box)

No.	Acid:	No.	Alkaline:
4862	(•4.8–6.2 pH)	6680	(6.6– 8.0 pH)
3650	(•3.6–5.0 pH)	7387	(7.3– 8.7 pH)
2439	(•2.4–3.9 pH)	8610	(8.6–10.0 pH)
1028	(1.0–2.8 pH)	10113	(10.1–11.3 pH)
0414	(0.4–1.4 pH)	11131	(11.0–13.1 pH)

•Electrometric Values in Nickel Solutions.

Each range is boxed separately.

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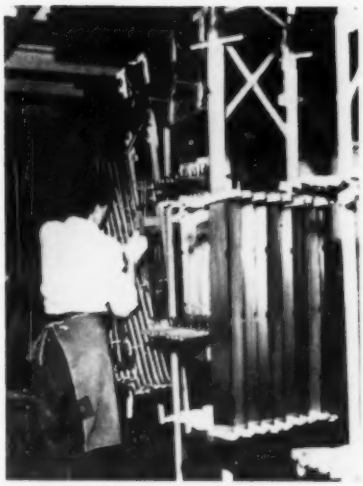


E—612. Automatic Turnaround—An automatic turnaround mechanism designed and built by Hanson-Van Winkle-Munning Co. makes it easy to put parts on racks on their way to anodizing machines. Swivel devices turn racks first one side out and then the other as racks travel along monorail.

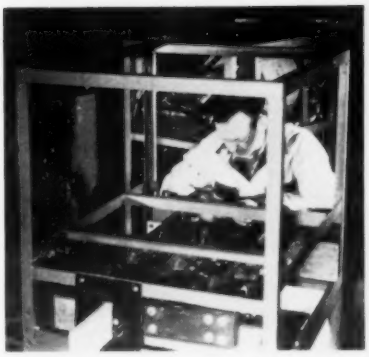
The load monorail carries racks to an automatic load mechanism, where racks are transferred directly to anodizing machine. After treatment, loaded racks are automatically transferred to unload monorail. Here the automatic turnaround mechanism is employed again as parts are taken from racks and placed on conveyor belts that carry them through infrared radiation for drying.

In operations in which stripping of racks is not required, load and unload monorails may be continuous, eliminating altogether the need for manual handling of the racks.

E—613. Solvent Cleaner—For rapid, cold cleaning of all metals to remove heavy oil films and solid dirt, Enthone, Inc. has developed Emulsion Cleaner 62. This new product is a gold-colored liquid which is furnished in ready-to-use form or as a concentrate. Simple immersion in the cleaner at room temperature for 5 to 60 sec followed by cold water rinsing is sufficient to completely preclean metals preparatory to plating, phosphating or blackening, the company reports.

This cleaner is low in cost and requires only a plain steel tank or drum without any heating or cooling facilities. It will absorb high concentrations of oil and grease before becoming inoperative.

The new cleaner is neutral in nature and will not attack such reactive metals as aluminum, zinc, brass or magnesium, it is claimed.



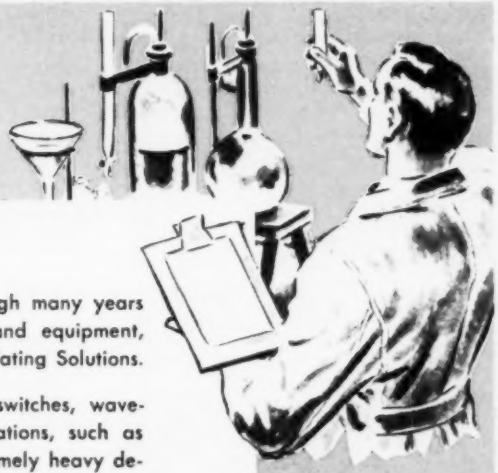
E—614. Plating Rectifier—High efficiency, no aging, ability to operate in ambient temperatures of over 200F and high voltage rating are among advantages claimed for a new silicon plating rectifier, announced by Wagner Brothers Inc.

The new unit, according to the company, besides requiring a lower initial investment, will save a user about one-third of the costs invested in power and maintenance every five years.

Designed for easy accessibility it can be adapted for a variety of controls, depending upon the application setup. It includes a class B transformer, and is equipped with a coil for each cell.

Other features of the rectifier include individual fusing, with pilot light failure indicator, single phase protection and blower type cooling fan.

Rhodium
ELECTROPLATING
SOLUTIONS



Technological knowledge acquired through many years of experience, plus special processes and equipment, assure the high quality of our Rhodium Plating Solutions.

Recommended for contact surfaces of switches, waveguide parts and other electrical applications, such as printed circuits...Can be applied in extremely heavy deposits, up to 100 milligrams per square inch.

Rhodium plating provides the advantages of whiteness, lustre and corrosion resistance of a precious metal.

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SIGMUND COHN MFG. CO., INC.
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E—615. Range Selector—A new range selector electrobalance has been announced by Cahn Instrument Co.

A twist of the range selector switch sets the balance to the desired range down as fine as 0–1 mg, up as heavy as 0-100 mg. Operation consists of one-knob control and one dial for weight reading.

It is said to be unaffected by vibration or temperature change. Portable, it can be carried anywhere.

With full scale ranges of 0-1, 0-5, 0-10, 0-20, 0-50, and 0-100 mg, it is claimed to replace up to six torsion-type balances, with precision and accuracy. Precision on the lower ranges is one mg. Accuracy is 0.05 per cent of full scale on most ranges.

This intrument can be used for determining plating thickness on very small parts, such as vacuum tube grids, transistor wires, etc.

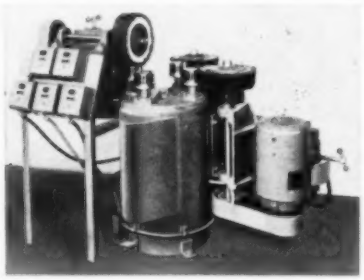
E—616. Phosphate Coating—A new cold Bonderite system for pre-paint phosphate coating of sheet has been announced by Parker Rust Proof Co.

The phosphate coating units now operate at much lower temperatures with resulting economies in over-all heat costs it is reported.

Additional benefits claimed for the system are reduced maintenance, shorter heat-up time, reduced down time and increased worker comfort around the installation. Maintenance crews can enter the installation immediately after shutdown to make adjustments or repairs.

E—617. Tumble-Barrel—Many different finishing operations and a wide range of products can be handled with the Model V4 and V6 precision barrel finishers, Rampe Manufacturing Co. claims. The machines have 4 and 6 cu ft barrels with two or three interchangeable compartments respectively. Both models have 23 rpm fixed speed drive, or an optional 12 to 36 variable speed drive. The cabinet is semi-enclosed. All welded construction is used, with heavy-duty self-aligning ball-bearing pillow blocks to withstand steel-ball burnishing loads and continuous production runs.

Other features include the orange-colored no-seam vinyl barrel linings; direct chain and sprocket drive, and a complete selection of timing and control accessories. Model V4 has a 3/4 hp 3-phase 220/440 v motor; model V6 has full 1.0 hp. The larger V6 measures 51½ in. long by 45¾ in. deep; both units are 49 in. high with 21 in. barrel clearance above the floor.



E—618. Automatic Polishers—New low cost automatic polishing and buffing equipment is offered by Murray-Way Corp.

Known as the Junior Automatic, it consists of a basic dial table with four powered work spindles and optional manual or automatic indexing with adjustable dwell.

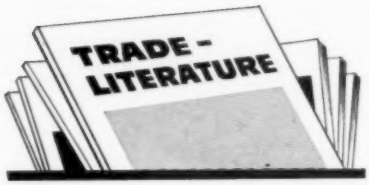
Polishing heads are available in a choice of standard horizontal, vertical or angled buffing wheels. Continuous abrasive belt attachments are also available.

The unit covers 6 by 8 ft floor area fully equipped.

E—619. Ultrasonic Machines—The new Series 200 Narda SonBlasters has just been introduced by the Narda Ultrasonics Corp. This series consists of four systems adapted to a wide range of laboratory and industrial operations.

It has been designed for economy in cleaning small precision made parts and subassemblies, or laboratory glassware and apparatus. Also, this unit is suited for emulsifying, plating, brightening, homogenization, radioactive decontamination, etching, impregnating and many other laboratory applications.

The series 200 equipment consists of an ultrasonic generator Model G-201 or G-202 and stainless steel transducerized tanks NT-201 or NT-202, 1/8 and 3/8 gal capacity, respectively.



L—600. Conversion Coatings—Bulletin 1424-A of the American Chemical Paint Co. deals with their line of protective and prepaint coating chemicals for aluminum. It discusses advantages of the coatings, methods of application, and equipment used in the processes. The type metal products treated are listed and a selection chart is included.

L—601. Circuit Breakers—A new 28-page two-color bulletin describing the General Electric complete line of industrial molded case circuit breakers with matching enclosures is now available.

The new publication, GEA-6754, provides all information necessary to select, specify and order breakers and enclosures. A special feature of the book is a new simplified guide for determining the proper ampere rating of circuit breakers.

L—602. Water Treatment Equipment—Permutit's new 12-page Bulletin 4433 "Outline of Modern Water Treatment Equipment" lists water impurities and methods of treatment, illustrates typical treatment systems and describes aerators, deaerators, precipitation equipment, filters and ion exchange equipment. It tells how each piece operates and gives its advantages, limitations, range of flow rates, etc.

L—603. Busway—General Electric's new 225–1000 amp plug-in Flex-A-Power busway with aluminum conductors is the subject of a new 24-page book (GEA-6173).

Known as the Type DE, the new busway is available in both three- and four-pole construction for three-wire, three-phase, or four-wire, three-phase applications. Type DE is designed for indoor use as a plug-in or feeder system in industrial plants and commercial buildings. It has a 50,000 amp RMS asymmetrical short circuit bracing as standard.

The new book lists features, applications, ratings, construction information, description, dimensions, weights, installation instructions and guide-form specifications.

L—604. Electro Cold Stripper—A line of multi-purpose paint removers manufactured by Allied Finishing Specialties Co. is described in newly available literature.

Features of the stripper are covered and it is pointed out that no heat or current is used. Painted parts, like rejects, carrying conveyances, etc., are immersed in the remover for a few minutes or just seconds according to the process outlined in the bulletin. When paint has been "popped" loose parts are rinsed with water, dried and refinished. The stripper is also used for removing photo resist coatings after the etch process.

L—605. Phosphate Coating—A new 4-page color brochure describing various phosphate coatings on steel for bonding paint and protecting the metal from underfilm corrosion has been made available by Amchem Products, Inc. These coatings can be applied to the surfaces by dipping, spraying or brushing.

L—606. Plastic Coating—A descriptive eight-page brochure showing methods of techniques for producing Reynosol, the plastic coating manufactured by Reynolds Chemical Products Co., has just been published by the firm. The booklet which also shows production views of the Ann Arbor firm is available upon request.

L—607. Stainless Steel—A new 386-page book on the fabrication of stainless steel is now being distributed by Allegheny Ludlum Steel Corporation.

The book, entitled Stainless Steel Fabrication, has more than 140 photographs, 120 charts and graphs, and about 200 special diagrams on the making of this versatile metal into usable products.

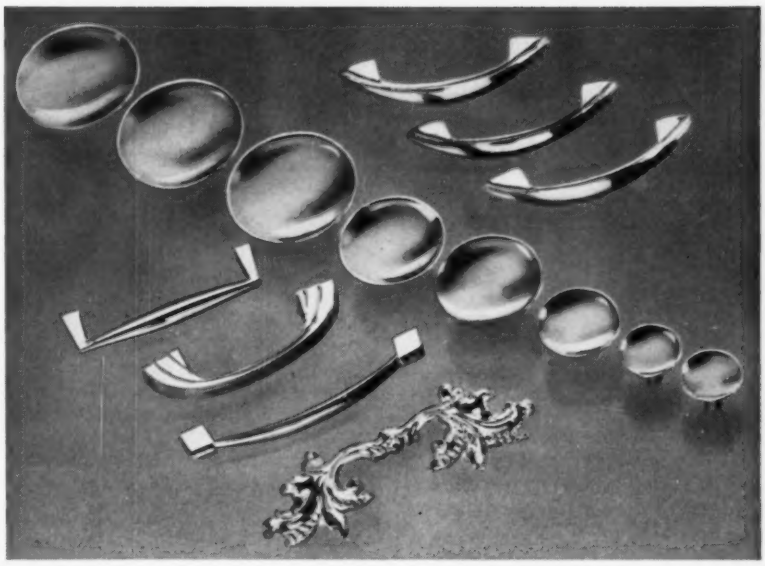
In addition, there is a complete section of almost 30 special reference tables on stainless steels. A detailed index for cross reference purposes is included in the hard-covered book.

The book has nine chapters, and goes into detail on every common method and practice for the successful fabrication of this metal.

There are such chapter headings as: surface treating operations, cutting operations, joining operations, cold forming operations, hot forming operations, machining operations, heat treating operations, and others.

L—608. Acid Resistant Chains—A 2-page data sheet, DH-169, covering ACCO X-weld acid pickle chain and X-weld Type 321 stainless steel chain, has been prepared by the American Chain Division, American Chain & Cable Co., Inc.

These high strength chains are designed to provide service in high temperature applications and also solutions of sulfuric or nitric acids as used in industrial acid-pickling operations. Working load limits, high temperature properties, physical dimensions and weights, all of interest to operating and maintenance personnel, are included.



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This means new business for somebody. It could be you.

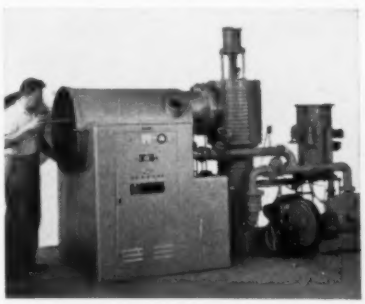
Because vacuum-metallized pieces now can "take it," thousands of products will, for the first time, be finished this new way.

More durable lacquers now protect the superb finishes only vacuum metallizing can produce at low cost. New lacquers and resins now stand up to rigorous abrasion tests and exposure to salt spray and high humidity.

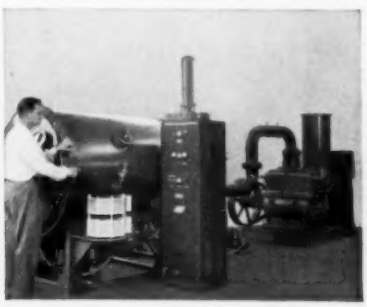
Vacuum metallizing is sure to grow rapidly. New business is waiting for you.

At CEC, we are ready to help you with a full range of vacuum coaters, headed by a large 48″ model for metallizing large pieces fast and at low cost.

We'll be glad to send you bulletins on our line of coaters, and share our experience in helping you set up operations.



30″ coater—model LCI-30
Typical production: 400 1½″ diameter pieces per cycle; 5 to 7 cycles per hour.



48″ coater—model LCI-48C
Typical production: 1450 2½″ diameter pieces per cycle; 3 to 6 cycles per hour.

Consolidated Electrodynamics
Rochester Division, Rochester 3, N. Y.

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PERSONALS

L. V. Gagnon

A. R. Cook

Louis V. Gagnon has joined Enthone, Inc., a subsidiary of American Smelting and Refining Co., as a sales engineer. As a part of Enthone's program for expanding and reorganizing its New England marketing staff, he will cover the Boston and Eastern Massachusetts district and will report to A. Harry Sanders, New England District sales manager.

Mr. Gagnon is a graduate of M.I.T.'s Lowell Institute School in mechanical engineering and has had over 22 years of experience in the metal finishing industry in both production and sales. He has held technical and supervisory positions with United-Carr Fastener Co. of Cambridge, Mass., and Gillette Safety Razor Co. of Boston. He has represented Sel-Rex Precious Metals, Inc. and, most recently, F. B. Stevens, Inc. as a sales engineer.

A familiar figure in the AES, Mr. Gagnon is a past president of the Boston Branch and has been a member of the Supreme Society for the past ten years. He was a member of the National Convention Committees of 1941 and 1950 and is chairman pro-tem of the 1961 AES National Convention to be held in Boston. He is presently serving on the AES National Membership Committee.

Albert R. Cook has been named as market development engineer for the American Zinc Institute, Inc.

Mr. Cook was formerly sales development engineer for Northern Aluminium Company, Ltd., one of the largest manufacturers of semifabricated aluminum parts in the United Kingdom.

A graduate of Downing College, Cambridge with an MA in metallurgy, Mr. Cook brings to his post broad experience in the application of metals throughout England.

T. Ross Welch has become general manager of TC Components Division of Brubaker Electronics Co. a subsidiary of Telecomputing Corp. Mr. Welch will take responsibility for the new division's design, manufacture and marketing of electronic products.

One of the country's recognized experts on relay design and development, Mr. Welch was formerly director of research and development for Elgin Watch Co.'s Electronics Division, Burbank, California.

Ross Welch is the author of a number of technical papers and holds many patents. Educated as an electrical engineer at the University of California at Los Angeles, and at the California Institute of Technology, he is a member of the AIEE, SAE, ISA, Operations Research Society, AES, Society of Environmental Engineers.

Grieve-Hendry Normalizing Ovens

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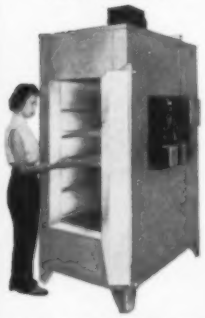
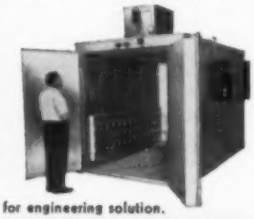
Why send work out? A Grieve-Hendry Oven will do the job of Stress Relief or Normalizing. Meets Aircraft and Military Specifications.



(Above) Bench Oven Model MT. Standard sizes. Temperatures to 550° F.

(At Left) Cabinet Ovens. 25 standard models to choose from. Temperatures to 1200° F.



Walk-In Ovens—Standard Models—eliminate engineering charges. Temperatures to meet requirements.

Send us your requirements for engineering solution.

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Member or non-member authors of technical and scientific papers on electroplating, metal finishing and related arts are cordially invited to submit manuscripts of original, unpublished papers to the Editor of PLATING for review and publishing consideration.

Any such paper accepted and published in PLATING will also be eligible, of course, for selection by the Society's Paper Awards Committee for the Carl E. Heussner Award; AES Silver Medal; AES Bronze Medal; George B. Hogaboom Memorial Award; Robert S. Leather Mechanical Finishing Award; Chromium Plating Award; Precious Metal Plating Award, or the John J. Hanney Memorial Award.

So as to expedite review and other processing, please write the Editor, PLATING, 445 Broad Street, Newark 2, New Jersey, for full particulars before submitting your manuscript.

FRANKLYN J. MacSTOKER

As PLATING goes to press, news of the decease of Past President Franklyn J. MacStoker has saddened the AES and PLATING. The 45th Annual Convention in session in Cincinnati recorded its grief. The obituary of the departed will be carried in July PLATING.

LOUIS J. DONROE

Louis J. Donroe of 11 Bayard Place, Newark, N. J., general manager of Pyro Metal Finishers, Inc., died Monday, May 12 in St. Michael's Hospital of a sudden illness. He was 52.

Mr. Donroe, who was born in New Haven, Conn., lived in Irvington and Newark for the last 25 years. He attended the University of Richmond in Virginia and was graduated in 1929 from Pratt Institute, Brooklyn, where he majored in chemical engineering. He was active in athletics at both schools.

He joined Pyro Metal Finishers, Inc., as a chemist in 1929. The firm then was known as Pyrene Manufacturing Co. He worked for seven years as chief chemist of the Royal Plating & Polishing Co., Inc., of Newark, and returned to Pyro as general manager five years ago. He performed the original research on bright nickel in the United States and introduced it to this country.

Mr. Donroe was one of the most widely known members and past president of the Newark Branch of the American Electroplaters' Society. He had chairmanned many committees during his nearly 20 years of membership. The Newark Branch's Christmas Parties and Ladies Nights were invariably under his guidance.

Mr. Donroe's Question and Answer Sessions had become classics at the New York and Newark Branches.

Surviving are his wife, Mrs. Frances Berger Donroe; a son, Frank W. of Brooklyn; a daughter, Miss Regina Donroe at home; three brothers, Albert, Joseph and William, and two sisters, Miss Anna Donroe and Mrs. Rose Valentino, all of New Haven, Conn.

Funeral services were held on Wednesday, May 14.

ARTHUR W. L'HOMMEDIEU

Following an illness of over two years, Arthur W. L'Hommedieu, president of Chas. F. L'Hommedieu & Sons Co., Chicago, died in his home at La Grange, Ill., on Sunday, April 13 and was buried on April 16. He was in his 82nd year.

Mr. L'Hommedieu was the last member of the original incorporators of the firm founded by his father, Charles F., brother, Charles Edward, and sister, Alice L'Hommedieu. It was his wish that the 60-year-old firm of Chas. F. L'Hommedieu & Sons Co. be continued by his faithful employes in the same manner as was done during the two years of his incapacity.

Arthur L'Hommedieu became president of the company in 1937 and held this office until his death. Previous to this, he served as secretary-treasurer.

He is survived by his widow, Margaret Brown L'Hommedieu.

If everyone had a health checkup every year, cancer's toll could be cut

Your doctor would have a chance to detect cancer at an early stage, when chances for cure are more favorable.

See your doctor. Soon.

And give generously to the American Cancer Society. Now.

Fight cancer with a checkup and a check

AMERICAN CANCER SOCIETY

PREVIEW OF FUTURE PLATING ISSUES

JULY 1958

POST CONVENTION ISSUE. Among other features, it will contain a pictorial and narrative account of the 45th Annual Convention.

AUGUST 1958

WATER AND WASTE TREATMENT. Another edition of this informative and popular feature.

NOVEMBER 1958

AIRCRAFT. Electroplating and metal finishing in the aviation industry will be featured in this second annual edition.

THE SEPTEMBER, OCTOBER and DECEMBER issues loom as strong 1958 General Issues.

JANUARY 1959

ABRASIVES AND MECHANICAL FINISHING. Developments in the various finishing methods will be featured in this annual issue.

MARCH 1959

ORGANIC COATING. The importance of organic finishing to electroplaters is increasing rapidly. New and review material will be presented.

R. G. Hazel

E. R. Krueger

Robert G. Hazel has been promoted to district sales manager by Kelite.

Mr. Hazel joined Kelite in February, 1957 as a sales engineer. Prior to that time, he served as a maintenance supervisor at the Port Arthur, Texas, refinery of the Gulf Oil Co.

Mr. Hazel will be in charge of sales in Kelite's Beaumont District, with headquarters in Beaumont, Texas.

Richard F. Hurley has been named technical sales representative for the metal-working chemicals division of Amchem Products, Inc., formerly The American Chemical Paint Company, Ambler, Pa. He will be attached to the St. Joseph, Missouri office and his area of activity will include Iowa, Minnesota, North and South Dakota, Colorado and Nebraska.

Edward R. Krueger has been appointed technical sales representative by the American Chemical Paint Company, Ambler, Pa., for their metalworking chemicals division. He will be attached to the Detroit Michigan office and his area of activity will include Wisconsin, upper Michigan peninsula, and northern Illinois.

Otto A. Pfaff, chairman and president, has retired as president and will continue as chairman of the board of Wheelabrator Corp., **James F. Connaughton,** executive president, has been elected president.

Mr. Pfaff has been with Wheelabrator since 1916 and served 22 years as general manager and 17 years as president and general manager.

Mr. Connaughton resigned last June as president of American LaFrance Corp. to join Wheelabrator. He is a former vice president and general manager of the Eddystone Division of Baldwin-Lima-Hamilton. He joined Baldwin-Lima when that company acquired Hooven-Owens-Rentschler.

C. James Civan has been appointed manager of the metal finishing systems division of the George L. Nankervis Co., Detroit engineering and manufacturing organization. **Angelo Giaier** has been named chief engineer.

C. J. Civan

A. J. Giaier

Mr. Civan has been with Nankervis as chief engineer since 1946. During this period he supervised the engineering and installation of several of the largest automatic electroplating systems. He is a member of the Detroit Branch of the American Electroplaters' Society, Engineering Society of Detroit, American Ordnance Association and is a graduate of Detroit Institute of Technology.

Mr. Giaier has been with Nankervis since 1952 as senior engineer in the metal finishing systems division. He is a registered professional engineer and a Wayne State University graduate.

Harold M. Cherry, long-time manager of the division and former president, will continue his association with the company on a consulting basis.

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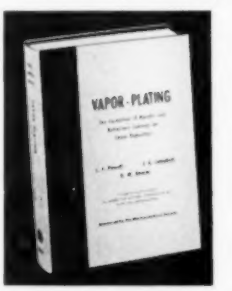

By C. F. POWELL, I. E. CAMPBELL, and B. W. GONSER, all at the Battelle Memorial Institute.

1955. 158 pages. Illus.
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AES Members $4.60

This is the first single source of reference for data and information on these processes. Provides a critical and authoritative review of the applications and techniques of vapor deposition of metals and non-metals.

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A. J. Mackan has been appointed Cleveland district sales manager for the Federated Metals Division of American Smelting and Refining Co. He has been with Federated Metals since 1946.

During the war, Mr. Mackan worked in personnel administration for the War Department. Prior to that, he spent several years in the finance business. He is a 1935 graduate of Ohio State University.

Isidore Friedman has been appointed to the newly created post of technical director of E. C. Electroplating, Inc., Garfield, N. J.

In expanding their precision plating services, the hard chrome specialists have announced that Research and Development, Quality Control, and Analytical Control will be conducted in the laboratory being erected by the company.

Prior to his joining E. C. Electroplating, Mr. Friedman was the head of the Plating and Surface Treatments Unit of Wright Aeronautical Division. He brings to his new position an extensive background in the plating of molybdenum and titanium, and in the study of the effects of electrodeposits on the physical properties of basis metals. He is a member of the New York Branch of the AES.

William R. Wardrop has been appointed sales engineering representative by Better Finishes & Coatings, Inc., 268 Doremus Avenue, Newark, N. J. for BFC protective coatings in the upper New York State area with headquarters at 150 Avalon Drive, Snyder, N. Y.

For the past eight years Mr. Wardrop has specialized in the use and application of corrosion resistant resin coatings and linings and sprayed metal and ceramic coatings. He is a member and past chairman of the Niagara Section of the National Association of Corrosion Engineers.

W. Samuel Carpenter 3rd, director of sales of Du Pont's petroleum chemicals division, has become assistant general manager of the company's electrochemicals department.

He succeeds **Charles B. McCoy** who has been named general manager of the elastomer chemicals department.

Mr. Carpenter, a son of Walter S. Carpenter Jr., chairman of the board of directors of Du Pont, has been with the company for more than 20 years, starting as an industrial engineer at the Chambers Works, Deepwater Point, N. J.

Two years later he was transferred to Wilmington, joining the planning section of the nylon division. He returned to the Chambers Works in 1942 and in 1944 was assigned to the construction division of the engineering department at the Hanford, Washington, Engineer Works, the government's atomic energy project designed and operated by Du Pont during the war.

Mr. Carpenter returned to Wilmington in 1945 and the next year he became manager of the planning division of the engineering department and later manager of the Industrial Engineering Division.

In 1947 he became assistant to the director of production of the rayon division. He was appointed manager of the rayon division's planning section in January 1950. In 1952 he was appointed director of manufacturing for rayon and became director of manufacturing for the cellulosics division in 1954.

Mr. Carpenter was transferred to the organic chemicals department as assistant director of sales of the petroleum chemicals division in 1955, and in March 1957, advanced to director of sales.

Born November 1, 1915, in Wilmington, he attended Tower Hill and Taft schools, and in 1938 was graduated from Princeton University, receiving the degree of bachelor of science in chemical engineering.

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Dr. Winslow H. Hartford of the Baltimore plant (Mutual Chromium Chemicals), Solvay Process Division, Allied Chemical, has been named research supervisor of Solvay's research center at Syracuse, N. Y.; **William H. Weed** becomes principal engineer and **George E. Best** joins the technical service department as technical advisor to the general manager.

Dr. Hartford received degrees in chemistry from Boston University and Massachusetts Institute of Technology. He also holds a PhD degree in inorganic chemistry from M.I.T. Dr. Hartford joined Mutual Chemical in 1933 as a research associate.

An engineering graduate of Massachusetts Institute of Technology, Mr. Weed was first employed by Mutual in 1940 as production supervisor.

Mr. Best, also a graduate of M.I.T., holds a degree in electrochemical engineering. Since joining Mutual in 1948, he has been associated with technical service work on chromium chemicals.

Other appointments include **Edward C. Bertucio** and **Robert D. Byers** to technical service; **Benedict F. Smith** and **Keith A. Lane** to the research staff; and **Donald W. Horgan, Craton D. Pitner** and **John M. Price** to the engineering section.

BOOKS

Remittance must accompany all book orders placed with AES Headquarters.

Effective Thickness of Chromium Plate on the Sensitivity of Magnetic Particle Inspection. W. Steindorf and B. Cohen, Wright Air Development Center, U. S. Air Force. Oct. 1957. 13 pages. Order PB 131608 direct from Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C., 50 cents.

Magnetic particle inspection is usually used to detect hidden cracks occurring in high-strength steel during and after chromium plating. The sensitivity of the crack-detection test is known to decrease as the thickness of the plating increases. This research confirmed the deleterious effect of chromium plating on the sensitivity of the inspection process. A thickness of 4.5 mils was established as a practical limitation for effective crack detection. It was indicated that the depth of a crack is the controlling factor in adequate detection, and that crack width has little effect.

1954–1955 Bibliographic Survey of Corrosion. NACE Publication No. 58-1, 468 pages, 8½ x 11 in., hard cloth binding, 1957. Compiled by A. Irene Humphrey. Published by National Association of Corrosion Engineers, 1061 M & M Building, Houston 2, Texas. $20.00.

A selection of 4287 abstracts of articles on corrosion and corrosion prevention published in 1954–1955 are compiled in this volume. Also included are a number of abstracts published from 1945 to 1953 which were not available for use in earlier bibliographies. Material was selected from abstracts compiled by 23 agencies covering literature internationally.

Abstracts are arranged topically, formulated over several years by experts in the field of corrosion, which divides the literature into eight main groups: General, testing, characteristic corrosion phenomena, corrosive environments, preventive measures, materials of construction, equipment and industries. Each main group is subdivided and topical cross-references are appended.

The subject index, in addition to terms in the NACE Abstract Filing Index, lists many metals and alloys by trade name and indexes them as to specific properties and to behavior in specific media. An author index is included. Referencing is to classification and serial numbers of abstracts for ease in searching. An appendix has been included to aid the user in locating and obtaining copies of unfamiliar foreign or domestic journals.

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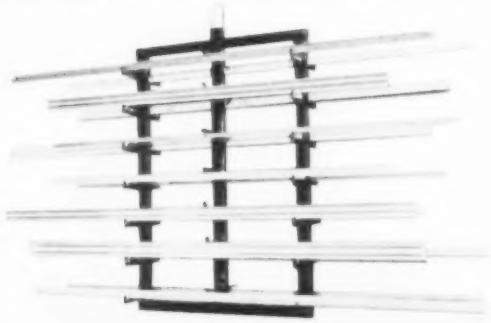

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BRANCH NEWS

Total AES Branches U. S., Canada Australia, June 1, 1958—58.

BOSTON BRANCH'S 22ND ANNUAL TECHNICAL MEETING AND BANQUET

(Left) A section of the technical session in the Bay State Room of Boston's Hotel Statler, May 3. While the men were in session, the ladies attended a matinee performance of a stage show. (Right) Usual order, Dr. D. Gardner Foulke presented a paper on waste disposal; F. Wayne Martin, educational chairman, extended the welcome of the Boston Branch and introduced the speakers; Kenneth M. Bellinger, spoke on conversion coatings; Dr. Ralph E. Pettit comprehensively covered the field of aluminum etching and chemical milling. The banquet in the evening was attended by 435 members and guests, many of whom received attractive door prizes donated by industry suppliers. Entertainment and dancing brought a successful annual event to an enjoyable conclusion.

BALTIMORE–WASHINGTON
Barrows Honored; Pot Presented to Eddy

On December 6, 1957 the Branch had a dinner party in Washington as a testimonial to **Wendell P. Barrows** on the occasion of his retirement from the Naval Gun Factory. This was in recognition of the personal feelings of the members as well as a tribute to his twenty-nine years of service to the Branch.

At the regular meeting on Dec. 10, 1957, **Dr. Karl Schumpelt** of the Sel-Rex Corp. presented a talk on "Bright Plating with Gold, Rhodium and Silver."

In January, **William E. Brandt** of the Lord Chemical Corp. of York, Pa. gave a comprehensive talk on "Precision Barrel Finishing and Finishing by Controlled Vibration."

Mr. and Mrs. Wendell Barrows with the plaque commemorating his 29 years of service to the Baltimore-Washington Branch presented by the Branch at a testimonial dinner in his honor in Washington.

Ezra A. Blount, well known to all of us as editor of "Products Finishing," was the speaker in February and his "Impressions of the Japanese Finishing Industry" supplemented by his own films on Japan in general made a highly successful evening.

The March meeting was a joint affair with members of the American Electroplaters' Society, Electrochemical Society and the National Association of Corrosion Engineers in attendance. The gathering featured a dinner and talk by **Clarence H. Sample** of the International Nickel Co. whose presentation concerned the corrosion behavior of copper-nickel-chromium, nickel-chromium, zinc, cadmium and lead electrodeposited coatings in marine and industrial environments.

April brought the annual dinner and dance which was attended by President and **Mrs. Francis T. Eddy.** Past President **Ken Huston** presented Mr. Eddy with "The Order of the Pot" which is an honor traditionally accorded retiring presidents by this Branch. The party was a huge success and enjoyed by all present.

We are pleased to report that six men have been added to the membership during the last few months.

E. E. Oberland
Secretary

BRITISH COLUMBIA
Electroplating Class Graduates; Hanna is Speaker

Thirty-one members and guests were present at the March 27 meeting.

President **W. Marquardt** explained how our electroplating course came into being, gave credit to those who had laid out the course and thanked **Walter Kellerman** the instructor. Following this he presented diplomas to the nine graduates who had attended the dinner meeting as guests of the local branch.

President Marquardt, as chairman of the nominating committee, gave a preliminary report of his committee with suggestions for the coming election at the May meeting.

The president introduced the guest speaker, **Dave Hanna,** of Canadian Hanson & Van Winkle Co. Ltd., Toronto, who gave a very interesting talk on recent developments and experiments in the bright nickel field. He explained how their laboratory had compared Watts type as well as high chloride solutions, both mechanically as well as air agitated, from a throwing and covering power point of view; with the air-agitated high chloride showing the most improvement over the plain Watts type. He then took up the question of throwing power, and illustrated his talk with slides showing varying thicknessess of the different baths on gramophone record stampers. Various other characteristics were discussed after which a question and answer period kept the group actively interested until the conclusion of the evening.

J. Lee
Secretary

BRITISH COLUMBIA
President Eddy is Guest Speaker

The meeting on April 16 was held at the White Spot Dining Room with 13 members and guests present.

The secretary mentioned the next two meetings, the June one possibly to include

a tour of the New Bristol Brittania at the C.P.A. hanger, with the ladies included.

President **W. Marquardt** mentioned again his desire for nominations from the floor in addition to those of the nominating committee.

Following this, our National President **Frank T. Eddy** was introduced by Mr. Marquardt.

Mr. Eddy spoke on the plating of wave guides and followed this by a very extensive outline of the functions of the Society, including its committees, awards and setup. He concluded the formal portion of his lecture by explaining the projected 1958–59 budget of the Society, which was followed by a question and answer period in which many varied topics were covered.

J. Lee
Secretary

BUFFALO
Members Present Own Technical Program

The regular monthly meeting of the Buffalo Branch was held at the Niagara Manor. After a delectable Smorgasbord dinner, which has become unanimously popular, we went into the business meeting with 31 members present. This was the lowest attendance of the year. After the miscellaneous business was taken care of, some of our own members, of various capacities in the industry, presented talks and participated in discussions which, taken as a whole, made this the best meeting of the year.

First Vice President **Frank Rudolph** arranged a program around some down to earth problems confronting the metal finisher. The talks were given by various members in a variety of positions in the plating industry, from the president and owner of a job shop to men in technical or supervisory capacity in the industry.

The following subjects were covered:

1. Present and new developments in anodizing.
2. New developments in vibratory burnishing.
3. Uses of new ratios in chromic acid contration in relation to the conventional 100-1 bath.
4. Use of agitated nickel for increased current densities, better throwing power, brighter deposits in shorter time, and increase in chrome receptivity.
5. The use of chelating agents to counteract contamination of the bath.
6. The use of various stripping agents, particularly for stripping nickel and chrome.

The lively discussion following each talk, and the fact that due to the lateness of the hour, several other subjects had to be held over for another meeting attested to the general acceptance of such informative talks, pointing up the fact that there are those of our own membership who have the know how, and can present it in a lucid and acceptable fashion.

Again we invite you to attend any of our meetings the first Friday of each month. Dinner at 6:30 p.m., meeting 8:00 sharp.

Ralph Stemmerich
Secretary

CAPITOL DISTRICT
Outing Scheduled For June

The Capitol District Branch met on Monday evening, April 7 at the Hot Shoppe, just north of Albany on Route 9. Because of the amount of business scheduled there was no speaker for this meeting.

Ed Frieberg, announced that application for two prospective new members have been requested from Sprague Electric in North Adams, Mass. The outing committee reported that our annual outing will probably be in June. The nominating committee announced the following slate of proposed nominees for the coming year for president, **John H. Green;** first vice president, **Robert Hill;** second vice president, **Zygamond Nash;** secretary, **William Allison;** treasurer, **Michael Guarnieri;** librarian, **Ed Frieberg** and for Board of Managers; **Ray Dunlevy, Robert Wolf** and **Art Eisner.** Further nomination will be open from the floor and elections to office will be held at the May meeting.

Ted Infield announced that the Capitol District Branch is now listed in the Directory of Schenectady area Chapters of Engineering Societies, prepared by the Schenectady Professional Engineers Society.

After the business meeting, sound and color movies on fishing were shown.

John H. Green
Recording Secretary

CENTRAL MICHIGAN
Ledford Speaks on Filters; New Officers Elected

Central Michigan Branch held its final dinner meeting and Educational Session of the 1957–1958 season on Tuesday evening, April 1, 1958 at the Roosevelt Hotel in Lansing.

The annual election of officers and board members was held during the business meeting. Results of the election were: **K. R. Haworth, president; D. D. Trafelet,** first vice president; **H. E. Welch,** second vice-president; **R. K. Martin,** third vice-president; **R. W. Boos,** secretary-treasurer; **H. Anderson,** librarian. Elected to the Board of Managers: **U. J. Forstyth, H. Marsh, William Mogle, F. W. Stuckenberg, G. S. Woodruff.**

One application for branch membership was duly voted upon and accepted.

MANUAL AVAILABLE TO BRANCHES

As a reference source to help Branches and Branch officers in effective Branch operation, many dedicated National and Branch leaders collaborated, without any remuneration, in preparing the comprehensive BRANCH OFFICERS MANUAL of the American Electroplaters' Society, embodying practically every conceivable Branch operating subject from membership promotion to Delegates' duties.

Within red covers bound by Chicago screws, this 225-page consolidated mimeographed looseleaf book is now in use in 36 AES Branches that ordered copies.

A limited extra quantity of the book is still available at National Headquarters for the accommodation of Branches that have not previously ordered copies. These will be sold to Branches (only), on a first-come, first-served basis so long as that supply lasts, at $5.50 per copy, including postage to one destination.

Write American Electroplaters' Society, Inc., American Building, 445 Broad Street, Newark 2, N. J. Payment should accompany order to obviate unnecessary bookkeeping expense.

The speaker for the educational session was **Ray W. Ledford** of the Industrial Filter and Pump Mfg. Co. Mr. Ledford discussed the subject "Filters for the Plating Room—Proper Applications and Maintenance." He was introduced by R. K. Martin, librarian.

A meeting of the new Board of Directors was held following the close of the regular meeting. Final plans were made for the annual Ladies' Night Party to be held at the Hotel Hayes in Jackson, Michigan on Tuesday evening, May 6.

K. R. Haworth, newly elected president, appointed **Earl Stadel** as research chairman and H. E. Welch as publicity chairman.

Upon motion the Board unanimously voted that life memberships in the branch be made to **Ray Redmond** and **E. J. Bosca** for outstanding past services rendered.

Homer E. Welch
Second Vice-President and Publicity Chairman

CHICAGO
Ladies Night Successful; New Officers Installed

On Friday evening, April 11, the Chicago Branch held its Annual Ladies Nite. The members and their wives attended a cocktail hour and dinner at Allgauer's Fireside Restaurant, in Chicago. The ladies were awarded door prizes.

The program for Ladies-Nite was a sound and color film of a visit to the island of Ceylon by **Robert Leighton,** reknown world traveler. Mr. Leighton gave a commentary throughout the showing of the film about the customs, the various religious festivals, and the various work of the people of Ceylon.

The officers who were elected by the members last month were installed to office and introduced to the audience. The officers installed were: President, **R. Scott Modjeska;** first vice-president, **Charles Geldzahler;** second vice-president, **Matt Dassinger;** librarian, **Joseph C. Corre;** secretary-treasurer, **Paul Glab.** The officers who served the branch the past year were given a gift in appreciation of their services rendered to the society.

Everyone enjoyed the amusing comments by Mr. Leighton during the course of the film which was educational and very interesting.

Christopher Marzano
Publicity Chairman

CINCINNATI
Safranek on Alloy Plating; Picnic in June

The meeting was called to order by President **Loveless** with 44 members and guests present.

Four applications for membership were approved.

Earl Leonhardt reported that the annual picnic would be held at the Lakeside Lodge in Sharon Woods on Saturday, June 21. The annual softball game would begin at 4:30 p.m. The platers will be led by **Ralph "Casey" Mustain,** and the suppliers will be piloted by **Stew "Wally" Chipman.** The horseshoe tournament will be held from 2:00–4:00 p.m. and dinner will be served at 6:30. Special events will be featured after supper until 11:30.

Chuck Wise reported that plans for the Convention have been completed, but that help is still needed especially at the Educational session on Wednesday and the Outing on Tuesday.

The auditing committee consisting of **Malcolm Fogg,** chairman, and **Walter Varland** was appointed by President Loveless.

William Safranek of the Battelle Memorial Institute discussed Alloy Plating. The speaker augmented his talk with slides which pointed out the results of tests carried out on the various alloys under consideration. The advantages and disadvantages of the alloys were discussed and examples of diffusion alloys were given. The discussion was closed with a question and answer period.

Will Loveless then turned the meeting over to next year's president, **Les Helmich.**

The group adjourned to the social hour sponsored by Globe Chemical Co. Door prize was won by **Tom Crutcher.**

David L. Kaplan
Secretary

CLEVELAND
Missiles Subject of Non-Technical Session

The regular April meeting of the Cleveland Branch took place on Friday, April 11, in the Lorenzo Carter Room of the

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Hotel Carter. The program was the annual "non-technical" session and the principal speaker for the evening was **Wilson Hunter,** assistant to the director of the Lewis Laboratory, National Advisory Committee for Aeronautics. He presented an interesting talk concerning our present missile program and the prospects for the future. Mr. Hunter is also president-elect of the Cleveland Technical Societies Council. The Cleveland Branch is a member of the Council.

New officers for the coming year were installed by **Bill Scott.** Bill's installation of the officers has become a tradition for the Cleveland Branch. As each officer was installed Bill delivered a charge to the candidate outlining the duties of his office. Officers installed were: **Bob Peters,** president; **Jack Winters,** first vice president; **Henry Sedusky,** second vice president; **Jim Long,** secretary-treasurer; **Gordon H. Carlson,** librarian; **Ralph Everstine,** assistant librarian and **Mort Van Loan,** Board of Managers.

The door prize was taken home by **Bert Lupien.**

Gordon H. Carlson
Assistant Librarian

COLUMBUS

Plant Tour Feature of Meeting

The regular monthly meeting of the Columbus Branch was held on Friday, March 7, at 6:30 p.m. in conjunction with a dinner and tour of the Jeffrey Manufacturing Co.

Following the dinner a short business meeting was held at which a new member was elected.

The members were then divided into groups and taken on an extended tour of the Jeffrey plant.

Halvor S. Christianson
Secretary

COLUMBUS

Smith on Metal Cleaning; More Organic Speakers Wanted

The regular monthly meeting of the Columbus Branch was held at Battelle Memorial Institute on Friday, April 4, at 8 p.m.

The business meeting was called to order by President **Calvin Smith.**

A candidate for membership was duly approved and elected.

A motion was made and seconded that the librarian for next year should supply speakers on organic finishing.

The nominating committee consisting of **John Beach, Nathan Koslin,** and **William Safranek** presented the slate of candidates for branch officers for 1958–9. The results of the election were: President, **Harry L. Moore;** first vice president, **Marvin Pingel;** second vice president, **Rudolf A. Skriletz;** secretary, **Halvor Christianson;** treasurer, **Frank Gentile** librarian, **Leslie D. McGraw;** Board of Managers: **Nathan L. Koslin, William J. Neill, Calvin G. Smith.**

Gil Osterfeld was complimented for his assistance in bringing in new members the past year.

President Smith introduced the speaker of the evening, **Dr. A. Lloyd Taylor** of MacDermid Western whose subject was "Metal Cleaning." Dr. Taylor gave a very interesting talk on the background and uses of metal cleaners.

Halvor S. Christianson

HAMILTON

Electroplating of Aluminum Presented By Pettit

The Hamilton Branch held its regular monthly business and technical meeting at Fisher's Hotel Feb. 21.

After the business meeting President **Bernie Teal** turned the meeting over to **Ken Taylor,** librarian, who welcomed our guest speaker **Dr. R. E. Pettit** of the Diversey Corp., Chicago.

Dr. Pettit gave one of the most interesting talks of the season on "Electroplating of Aluminum" and was well received by the large turnout of members and guests.

The meeting was adjourned at 11 p.m., after refreshments.

Don Darby
Recording Secretary

HAMILTON

Emmett Is Speaker; New Officers Elected

The regular monthly meeting was held at Fisher's Hotel Friday, March 21. It was called to order at 8:15 p.m. by President **Bernie Teal.**

Bill Finlay, head of the nominating committee, presented the following list of nominees all of whom were elected to office for 1958–59: President, **T. L. Edwards;** vice president, **K. J. Taylor;** librarian, **R. MacLeod;** secretary, **D. Moss;** treasurer, **E. K. Cranfield.**

Ken Taylor then introduced our speaker **Harry E. Emmett,** technical service director, Glidden Co. Ltd., Toronto.

Mr. Emmett gave an informative lecture on automated finishing systems in painting.

After refreshments, the meeting was adjourned at 11:15 p.m.

Don Darby
Recording Secretary

HARTFORD

Logozzo Presents Picture And Installs Officers; Schneiders Speaker

The regular Branch meeting was held at the Hotel Bond on April 20 and 45 members and guests were present. Through the courtesy of the Nutmeg Chrome Co., **Arthur Logozzo** presented, with commentary, a new color movie on "Mold Polishing."

Mr. Logozzo then installed the new slate of officers: President, **Arnold Johnson;** first vice president, **Armand Faucher;** second vice president, **Walter Dyber;** secretary, **Stanley Platoz;** treasurer, **Joseph Loersch;** educational advisor, **Richard Mullaney;** educational committee, **Edwin Crandall,** chairman; **Robert Tiers** and **Ruel Katz.** Board of Managers, **Walter Acker, Stanley Grabowski, Harold Gurney** and **Andrew Palm.**

The guest speaker for the evening was **Frank Schneiders** of Enthone Inc. whose subject was "Rectifiers, The Inside Story."

By means of the oscilloscope, Mr. Schneiders was able to demonstrate ac and dc waves, ½ wave and full wave rectification, use of filters to remove ripple

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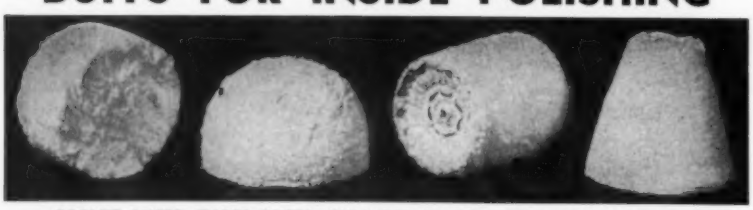

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effects, etc. Mr. Schneiders described the materials used in making a rectifier and the various types now being used.

The technical chairman for the evening was **Harry Sanders.**

Stanley Platoz
Secretary

INDIANAPOLIS

Ladies Hear Saltonstall On Costume Jewelry Plating

March 5 being Ladies Nite for Indianapolis Branch, the affair was held at the Sheraton-Lincoln Hotel. After the cocktail fellowship, 64 members and ladies enjoyed a fine dinner. The ladies were pleased with the favors and all appointments.

Applications of four new members with the proper requirements were presented. **Les Reynolds** made a motion seconded by **Harold Tossell,** to accept them.

Introductions of each member and his wife followed. Happy birthday greetings were sung to **Mrs. Walter Binai** and **Dr. Stark.**

Addison Howard introduced **Dr. R. B. Saltonstall** of the Udylite Corp. who talked about "Plating of Costume Jewelry."

Dr. Saltonstall gave a brief summary of the molecular theory pertaining to electroplating. Costume jewelry is usually made of low melting point metal to keep cost and ease of making different patterns to a minimum. Ten to 20 minutes is the usual plating time for bright nickel, and six to 15 seconds for gold plates, it it is desired. Some jewelry receives rhodium or silver plating, and then a light coat of clear lacquer.

The findings, or the parts that attach the jewelry to the wearer, are then applied. If stones are used these are attached by several different methods. The better quality jewelry contains stones from Czechoslovakia.

Some jewelry finishes are obtained by using high-purity aluminum in vacuum applicators, anodized with different colored dies.

Paul Freeman
Secretary

LANCASTER

Brandt on Tumbling; Visit To Lord Plant

The regular meeting of the Lancaster Branch took place on April 11 at Lincoln Woods Inn, East York, Pa. with 27 members present. During our business meeting new officers were elected for the ensuing year, as well as a new alternate delegate, **John Schreck Jr.,** to replace **William Klunk** who recently retired and resigned from the Branch.

Joe Shockcor was appointed to review our existing Branch by-laws for the purpose of enacting changes to conform with the national by-laws.

Our new officers elected are: **Robert S. Plaisted,** president; **Chester A. Smith,** vice president; **Paul Sharretts,** secretary treasurer; **George Geesey,** librarian. Board of Managers, **Art Arsenault, Harry Saylor, and Curvin Miller.**

Three new members were elected to the Branch.

Our educational program consisted of an excellent talk on Tumbling and Tumbling Equipment by the very capable **William Brandt Sr.,** vice president of Lord Chemical, York, Pa. After the talk we proceeded to Lord Chemical's new plant to see their equipment for processing sample parts as well as displays of parts before and after tumbling. Lord Chemical's new vibrator was demonstrated and caused considerable interest among the members and guests present.

Robert S. Plaisted
Secretary

MILWAUKEE

Modjeska and Michalski Present Papers

The 488th regular meeting of the Milwaukee Branch was held April 4, at the Maryland Hotel, with **E. H. McCoy presiding.**

Robert Steurnagel, chairman of the Nominating Committee, submitted the following nominees as candidates for offices: President, **Frank Marshall;** first vice president, **S. Taterzynski;** second vice president, **L. Warnecke;** librarians, **Walter Higgs-Inorganic; Ted Sobczynski—Organic;** secretary-treasurer, **F. Padgett;** Board of Managers, **K. Olsen.**

Henry Bornitzke informed the Branch that further nominations are encouraged from the membership providing the nominee will serve if elected.

The chair called on **Leslie Diveley** to explain to the membership the role of

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delegates as set forth in the national by-laws changes. Mr. Diveley explained that the Delegates of all Branches composed the Supreme Society. As the AES's governing council, the Supreme Society's work is not limited to Annual Convention Meetings. It legislates as the occasion requires throughout the year. Hence the Delegates' job is not only to represent the Branch at Annual Meetings but also to function for it throughout the year on Supreme Society business referred to them by letter ballot for policy consideration and action.

Ted Sobczynski reported that all publicity and notices on the Annual Branch Meeting have been taken care of.

Gene Piellusch presented the speakers for the evening.

The inorganic speaker was **R. Scott Modjeska,** consultant engineer of Scientific Control Laboratories. He presented a paper on "Pickling and Inhibitors in Plating."

The organic section heard **Donald Michalski,** chemical engineer of Commerce Industrial Chemicals, speak on the "Proper Use of Solvents."

S. Taterzynski
Secretary-Treasurer

NEWARK
Lowenheim And Fox Speakers; Officers Elected

The meeting of the Newark Branch was held at the Hotel Robert Treat on March 31, with 65 in attendance. One application was received and five were elected to membership. **Joseph Petrocelli** of International Nickel Co. was transferred from Waterbury to Newark.

Visitors **Ed Saubestre** and **Don Wood** of New York Branch were introduced. **Dodd Carr** transferred the copyright on the Newark Branch Electroplating Course Manual, "Basic Practical Electroplating," to the Branch.

Two motions, one that the Branch accept the assignment of copyright with thanks and the second that the Newark Branch permit the AES or any AES Branch to reproduce the manual under the copyright, were passed.

Don Wood and Ed Saubestre graciously served as tellers for the Election of Officers and the following were elected: **Gustave Bittrich,** president; **Fred Meyer,** first vice president; **John Banta,** second vice president; **Don Foulke,** secretary; **George Wagner,** treasurer; **Al Korbelak** Librarian; **Howard Martin,** sergeant-at-arms. Board of Managers: **Thomas Austin, William Grigat, George Reuter, Clifford Struyk.**

Edward Faint, one of Newark Branch's oldest members and a charter member of the Society, charged and installed the officers, all of whom were present except George Wagner, who was vacationing in Florida.

Gus Bittrich took over the chair and, after congratulating the outgoing president for having carried the Branch through a great year, he presented a Past President's pin to Bill Grigat.

Librarian Al Korbelak then introduced **Leonard Fox** of RCA who presented as his Timely Topic an interesting paper on the "Plating of Semiconductors and Transistors." He described the use of nickel, gold and lead-tin baths for various reasons and noted the use of electroless nickel in certain applications.

Dr. Fred Lowenheim, Metal and Thermit Corp., discussed "Corrosion of Plated Finishes." Colored slides of corrosion panels were shown for copper-nickel-chromium, nickel-chromium, tin-nickel, copper and tin-nickel, and copper and tin-nickel with a chromium top-coat, for various types of exposure. The importance of good corrosion resistant deposits was stressed.

D. Gardner Foulke
Secretary

NEW HAVEN
Hear Gustafson On Barrel Plating

New Haven Branch met Tuesday, April 8, at Mason Laboratory, Yale University with President **L. F. Roberti** presiding. Three new applications for membership were presented and voted on. Several

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communications were read by Secretary **B. J. Gaffney** and were discussed by the members.

The following officers were nominated and elected for the coming year: President **Charles A. Kuster;** vice president, **George F. O'Conner;** secretary-treasurer, **Bernard J. Gaffney;** librarian, **Harry A. Taylor;** assistant librarian, **Edward F. Foley Jr.;** sergeant at arms, **Edward Jorczyk;** historian, **William E. Bridgett.** Board of Managers, **Leonard F. Roberti, Austin P. Jackson, William K. Murray.**

Following the traditional presentation of the Past President's Pin to outgoing President L. F. Roberti, new President Charles A. Kuster turned the meeting over to Technical Chairman Edward F. Foley Jr., who presented the speaker of the evening, **Ernest L. Gustafson,** sales engineer of the Norton Company, Worcester, Mass.

Mr. Gustafson's topic "Recent Developments in Barrel Finishing" was extremely well presented, and the interest it aroused was proven in the lively question and answer period which followed.

The door prize presented by **Bernie Gaffney** of the Stratford Chemical Co. was won by **Joseph F. Hartl** who assisted Mr. Gustafson in his presentation. A just reward for a job well done!

William E. Bridgett
Historian

NEW YORK
Saubestre Re-elected President

The March 14 meeting at the Hotel Statler was called to order at 8:30 p.m. by the president, **Dr. Edward Saubestre.** One new application for membership was received and forwarded to the Board of Managers.

The officers for 1958–59 are: president, **Dr. Edward Saubestre;** first vice president, **Joseph Rembecki;** second vice president, **Jack Weiner;** recording secretary, **Anthony P. Briganti;** financial secretary, **Angelo Amatore;** librarian, **Arthur Carlson;** secretary-treasurer, **Milton Nadel;** seargent-at-arms, **Marty Pollack;** Board of Managers, **George Herrmann.**

The President urged everyone to participate in all branch functions. The recording secretary will accept the names of members who wish to assist on various branch committees.

The president explained a proposed idea that the National Society collect "per capita" dues directly from the members rather than from the branch secretaries. It is strongly felt that most of the branches would be weakened should this idea become an amendment. Also, it was reported there is more talk on raising of the "per capita" dues and it is more than likely that this will be one of the orders of business at the coming convention in Cincinnati.

Rising costs have caused us to consider the following suggestions: 1) The branch to limit itself to hold one meeting per month. 2) Obtain permission to operate our own movie projector. 3) Limit ourselves to one (invited) speaker per month. A second speaker would be supplied from local talent.

The feeling among the members present seemed to be in favor of retaining the two-meeting system. This was determined after a rather lengthy discussion.

The librarian, Arthur Carlson presented a film entitled "Shortest Way." This film, shown by the courtesy of "The Doehler-Jarvis Co.," reviewed the complete picture of die-casting, polishing and plating of zinc base die castings.

Anthony P. Briganti
Recording Secretary

PHILADELPHIA
Pierdon On Costs; Sustaining Members Night

The regular meeting was held on April 28 at the Engineers' Club with 64 at dinner and about 75 at the meeting. As this was Sustaining Members Night, First Vice President **Cogan** read the names of the Sustaining Members in the Philadelphia area and introduced their representa-

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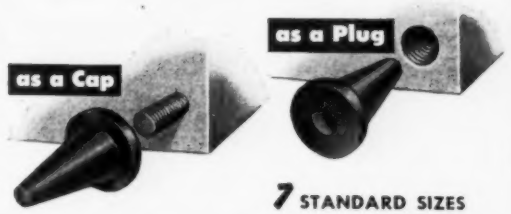

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tives present. Guests, including **P. P. Kovatis,** executive secretary of the NAMF, were also presented.

One application for membership was received and six new active members were admitted. Mr. Cogan gave the details on the Ladies Night activities to be held at the Sandy Run Country Club, Oreland, Pa., on Friday, June 20. Featured would be golfing in the afternoon; cocktails, dinner and dancing in the evening; cost—$3.75 per person. Mr. Cogan also announced the annual educational session would be held at the Sheraton Hotel on Friday, October 31 at 8 p.m., with the banquet being held the next evening. This separation of events was a new departure for the Branch. The Executive Group's recommendations regarding expenses for the Delegates attending the Cincinnati Convention were adopted. By a motion, the Delegates were instructed to speak at the Convention for the National Convention to be held in Philadelphia at the next open date. A motion was passed that a committee be appointed to formulate plans for a suitable celebration in 1960, commemorating the golden anniversary of the Philadelphia Branch.

Arthur G. Pierdon, The Art Metal Finishing Co., spoke on "Figuring Plating Costs." He stated that direct labor can be used as a yardstick. This added to overhead will give the cost. After speaking briefly on costs, using the NAMF Cost Survey for 1954 as a basis, Mr. Pierdon invited questions from the audience for further discussion, which continued until adjournment at 9:40.

I. Wm. Marcovitch
Secretary

ROCKFORD
Monowich Gives Paper; Golding New President

The regular monthly meeting of the Rockford Branch AES was held Monday evening at the Faust Hotel with 27 for dinner and 39 in attendance for the business meeting which followed.

Bill Geissman opened the meeting. **Al Overbey** reported on the success of the Annual Educational Session and Banquet.

Installation of officers for the 1958–1959 season was capably handled by **Bert Harvey.** After this new President **Stuart Golding** named **Martin McCoy** chairman of the Organic Finishing Department, **Bob Twying** was named chairman of the Membership Committee.

A motion was made by **Bill Geissman** to dispense with the annual picnic usually held in June. This was laid over to the May Meeting.

Dave Stockton won the free dinner.

Bob Twying introduced **Dr. Monowich,** director of chemical engineering of the Argone Laboratories, who presented a very interesting paper, after much discussion the meeting adjourned at 10:10 p.m.

E. J. Budden
Secretary-Treasurer

ST. LOUIS

Want 1964 Convention; Fuelling on Chrome Plating

The regular monthly dinner meeting of the St. Louis Branch was held at the York Hotel, Wednesday evening, March 12 with 26 people for dinner. There were 34 present when the business meeting was called to order by President **Craig McAlister.** Members and guests stood and introduced themselves.

One new member was elected.

Louis Berra reported for the banquet committee. The attendance will be limited to 400. The year book will be larger and better.

Andy Julius reported the city would like to have the convention here in 1964. A brochure is available showing the highlights of the facilities.

Gerry Cloony was commended by the chairman for his work on the telephoning committee. Fifty-five people were contacted. The turnout was good.

Andy Julius was appointed to investigate the possibility of an organic coating division of our branch.

The chairman appointed the following nominating committee: **Dale Bolyard,** chairman; **Arthur Wrisberg,** Louis Berra.

The May meeting will be an open meeting honoring the past presidents. Andy Julius reported on the proposed regional meeting for ten branches here in the Midwest. It would be informative, and support delegates for bringing the Convention here in 1964. It also would gain support for local candidates for National Office.

Louis Berra mentioned that there would be a new plating class starting this fall. Anyone who knows someone who would like to attend should contact **Edward Sertl,** chairman of the Educational Committee.

Two questions were removed from the question box which produced considerable discussion. At this point the meeting was turned over to **Ruel Shumway** who introduced **Louis Fuelling** of the technical sales staff of Diamond Alkali Co. He made an interesting talk accompanied by slides covering up-to-date chrome plating. An interesting question and answer period followed. A rising vote of thanks was given Mr. Fuelling and the meeting was adjourned at 10:10.

Ward W. Kelly
Secretary

SAN FRANCISCO

Eddy Installs Officers And Speaks on National AES

The April meeting was held on Thursday the 24th at the International Inn, South San Francisco. Twenty-six members and guests were on hand to greet our National President, **Francis T. Eddy.**

New Officers were installed under the guidance of Mr. Eddy. After the installation, **Jack Hite,** the new president of the San Francisco Branch, turned the meeting over to Mr. Eddy who talked on "The Function of the National Society."

Jack Hite set up a membership committee composed of the following members: **Ralph Pattenger, Howard Frantz, Fred Huntington.**

The committee will work under the guidance of **Guy Condrott,** first vice president.

Jim Pope brought up for discussion the subject of the formation of a new branch in the Palo Alto area to cover the requirements of the electronics industry.

Meeting was adjourned at 10:45 p.m.

R. T. Coen
Secretary-Treasurer

SOUTHEASTERN

Luce Of Duriron; Branch Wants Next Interim

The Southeastern Branch held its regular meeting at the Belmont Steak House on April 11, **Charles I. Lewis** presiding. Under the motion of **H. R. Stogner Sr.,** the Branch voted to invite the next Interim Meeting. The membership voted to absorb the extra 3-month per capita tax out of the treasury and not charge the members. At the suggestion of **M. M. Randman** consideration was begun for promoting the interest of organic finishing in the Branch. **Walter**

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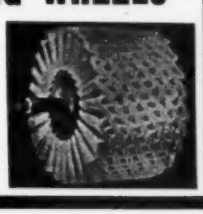

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A. Luce of the Duriron Company spoke on "Materials for Handling Corrosive Plating Solutions" and answered our many questions from the floor. The new officers, announced last month were installed.

Robert H. Probert
Secretary-Treasurer

SPRINGFIELD
Gibson Speaks On Anodes; August Social Planned

The Springfield Branch met at Blake's Restaurant for the April meeting, and immediately after opening the meeting, President **Charles Griffin** made an announcement which deeply affected the entire membership. One of the Branch charter members had died, the day before, after an illness of some duration. **Colin Hastie** was well known and equally well liked by all who knew him. He was a foreman at Westinghouse Electric. We, of the Branch, will miss him.

Since the first Golf Outing was such a success, the Activities Committee came up with the program of combining a similar program with the installation of officers which would usually be the final meeting of the season. The affair will be held on Saturday, June 14, at the Whippernon Club in Russell with a 1:00 p.m. tee-off time.

Mel Roske, chairman of the Activities Committee, also announced that plans for an August Social for members and wives, and friends, were in the process of being developed. Nothing definite was promised or explained, but from past activities of this committee, it's gotta be good. Working with Mel, are the following: Tickets, **Alexander "Al" Salmond;** Prizes and Gifts, **Elery "Gibby" Gibson;** Menu, **Martin "Marty" Murray;** Spark Plug, Melvin "Mel" Roske, and Planning: All of Them. **Roger R. Heroux** and **Wayne B. Sanders** have been appointed to serve temporarily, due to the limited time.

The Branch secretary brought in a box of identification badges which were distributed to the individual members and guests, as a sort of get-to-know-your-neighbor program.

A new member was elected.

Among the guests present, were: **Jim Moran** of Hampden Color and Chemical Co., **Walter Dyber** of MacDermid, Inc. of Waterbury; **Ralph McCahan** of Dupont, Inc. of Hartford, **Dave Carpenter** of Hamilton Standard, **Bob Michaud** of W. D. MacDermid of Bristol.

The Branch Secretary gave a report of the progress being made in the organizing of the Valley Council of Technical Societies, and the writing of the Constitution and Bylaws. The Springfield Branch is a charter member of the Council and the Branch Secretary was elected as a member of the Board of Directors for two years.

President Griffin thanked everyone for wholehearted support and cooperation during this past year which he felt helped to make his term successful.

The meeting was turned over to Librarian **Elery C. Gibson,** after being adjourned and Gibby introduced the speaker, **Jack Winters,** who founded Industrial Chemical And Research Co. of Cleveland. Jack spoke on the "Anode Side of the Story," with explanatory slides. The subject was well received by the group present and gave Jack a rising vote of thanks.

Henry L. Heissfeld
Secretary

TOLEDO
Interest In Organic Finishing; Walthern Is Speaker

The Toledo Branch held its April meeting with 23 members present. One of the members asked why a smaller number of practical platers were attending meetings than in the past. It was the opinion of the majority that this was a common problem of all similar organizations.

The members voted to cancel the June meeting and start the fall meeting in September. Also, it was decided to obtain an outstanding speaker on Organic Finishing and invite the area organic finishers to this meeting, hoping to induce them to join the society.

Mr. Walthern of Roto-Finishing Co. was the speaker of the evening. He presented a discussion of the application of the Roto-Finish process to special deburring problems.

Ben Gomersall
Secretary-Treasurer

TORONTO
Sanborn On Nickel Plating; Regional Held

The Toronto Branch held its April meeting on April 11 at the Royal York Hotel, with an attendance of 32 members for dinner. **Martin Phillips** of Industrial Platers turned out for the first time in a long while—make it more often Martin. Thirty-eight attended the meeting to hear **Charles Sandborn,** electroplating section of the Development and Research Division, International Nickel Co., New York City, present a paper on "Industrial Nickel Plating".

He was introduced by **Herb Skelton,** past president, the paper was accompanied by slides. The speaker was thanked by **Pat Patterson.** All arrangements are completed for the Branch Regional Meeting at the Sheraton-Brock Hotel, Niagara Falls on May 3, 1958. A program has been arranged for the ladies while the 'boys' attend the lectures, as there is no saturation point in education.

A. W. Wilson
Librarian

WATERBURY
Pollay On Coatings; Blount Promotes Convention

The April meeting was held on Thursday, April 10, at the Roger Smith Hotel. The meeting was opened by President **Spencer Henn** whose first duty was to ask National President **Francis T. Eddy** to install the newly elected officers for the coming year. This was done with Mr. Eddy's characteristic efficiency.

Mr. Henn's talk, summing up the accomplishments of the past year, put special emphasis on the fine work done by his committees during his period in office. In particular he cited the work of **Ray Mitchell,** research chairman, for his efforts in increasing the number of sustaining Members from 14 to 40 in spite of the resignation of one member from last year.

Ezra Blount of "Products Finishing" visited with us and invited us to participate in the AES National Convention in Cincinnati.

The speaker for the evening was **Harold Pollay,** chief chemist, of the Chemical Coatings Corp. whose topic was "A Review of Organic Chemical Coatings." We were brought up to date on the latest materials used in the organic coating field plus a good discussion of the physical properties of the various coatings on the market today.

The next meeting will be held May 8, 1958.

F. A. Schneiders

WESTERN ONTARIO
Kaufman Talks On Anodizing; New Officers

The March meeting was held at the Wm. Pitt Hotel in Chatham with 22 members and guests present.

Alexander Corbit requested postponement till fall of the meeting scheduled to be held in London on May 23. This date falls during the week of the National Convention, therefore the May meeting will be held in Chatham on May 30.

The Nominating Committee's slate of officers was elected uncontested: President, **Dave Mainland;** vice president, **Leo Horodyski;** secretary-treasurer, **Bob Dobson;** librarian, **Jim Kelly.** Board of Managers: **Earl Patterson, Ralph Manning, Paul Croly.**

Guest speaker was **William Kaufman,** of Eaton Chemical and Dyestuff Company of Detroit. His subject was "Anodizing." Mr. Kaufman discussed operation of the commonly used anodizing baths and offered many suggestions for the successful operation of the etch, bright dip, dye and seal baths. The trend being toward increased use of aluminum in the automotive industry, he cautions the metal finishing shops to be ready to participate.

D. R. Mainland
Vice President

AES MEMBERSHIP REPORT

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New York: J. Alter

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Cleveland: J. J. Becker to Cincinnati
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Los Angeles: H. R. Smallman to San Francisco
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AMERICAN ELECTROPLATERS' SOCIETY

June 20—**Kansas City Branch,** Stag Party, Kansas City, Mo.

June 21—**Syracuse Branch,** Clambake, Wysocki's Grove, South Bay, N. Y.

July 26—**Detroit Branch,** Stag Day, Hillcrest Country Club, Mount Clements, Mich.

Oct. 31–Nov. 1—**Philadelphia Branch,** Annual Educational Session and Banquet, Hotel Sheraton, Philadelphia, Pa.

January 31, 1959—**Cleveland Branch,** Annual Educational Session and Dinner-Dance, Cleveland, Ohio.

June 14–18, 1959—**Golden Jubilee Convention and International Exposition, Including Fifth International Conference on Electrodeposition and Metal Finishing,** Detroit, Mich.

July 10–14, 1960—**47th AES Annual Convention,** Hotel Statler, Los Angeles, Calif.

June 18–23, 1961—**48th AES Annual Convention,** Hotel Statler, Boston, Mass.

INTERSOCIETY

June 15–19—**American Society of Mechanical Engineers,** Semiannual Meeting, Hotel Statler, Detroit, Mich.

June 22–27—**American Institute of Chemical Engineers,** International Meeting, 50th Anniversary, Philadelphia, Pa.

June 22–27—**American Society for Testing Materials,** Annual Meeting and Exhibit, Hotel Statler, Boston, Mass.

June 26–27—**Society of the Plastic Industry,** Midwest Section Conference, French Lick-Sheraton Hotel, French Lick, Indiana.

September 12—**Society of Plastic Engineers,** Regional Technical Conference, St. Clair Inn, St. Clair, Mich.

Sept. 28–Oct. 2—**The Electrochemical Society,** Fall Meeting, Chateau Laurier, Ottawa, Canada.

November 18–20—**9th National Conference on Standards,** American Standards Association, Hotel Roosevelt, New York, N. Y.

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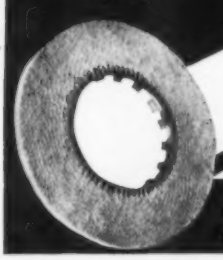

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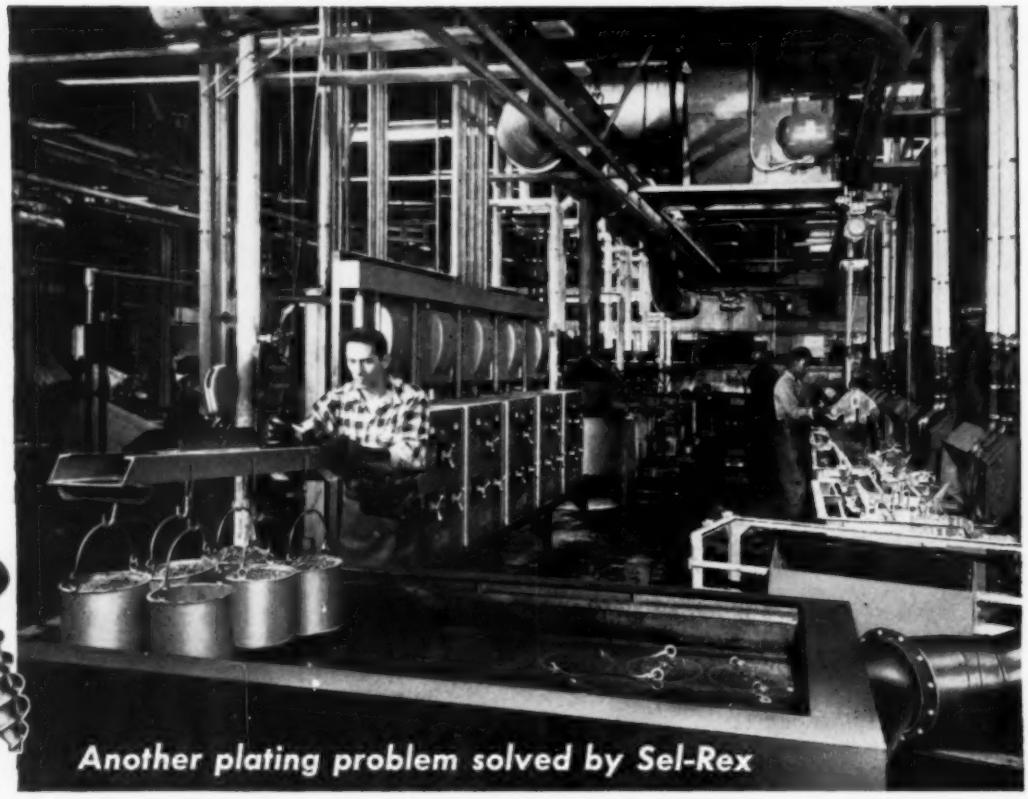

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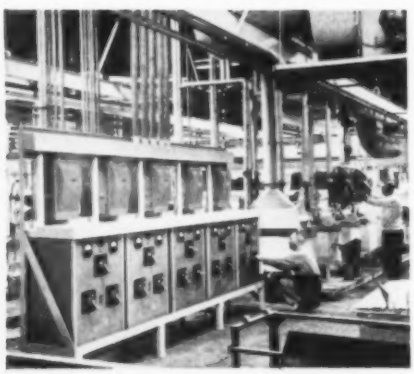

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